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Sero-Diagnosis of Rabies

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EVER since the discovery of Negri bodies, their demonstration has been the only dependable laboratory means of diagnosing rabies. While this method is reliable, it has the disadvantage that the diagnosis can be made only postmortem. The animals must be killed and the brain examined in order to make a positive diagnosis; this results in the needless destruction of many valuable dogs upon suspicion, the postmortem examination often showing the clinical diagnosis to have been incorrect. Besides the economic loss due to the destruction of these animals, there is the added disadvantage that persons are sometimes bitten by unknown dogs, or dogs which for other reasons are unobtainable, and therefore no brain examination is possible.

These considerations led me to search for another method of making the diagnosis of rabies, one that would, if possible, overcome the above objections.

I treated a number of aminals with a strong rabies virus, which had been proven to be sufficiently virulent to kill the control animals by brain inoculation in the usual period; this treatment never produced clinical rabies, the animals remaining healthy and their serum constantly contained immunizing bodies sufficiently powerful to protect other animals against the disease. The blood of these animals undoubtedly contains antibodies which fix the complement with antigen.

I first attempted to make an antigen from the nervous system of rabid animals, but without success. I then used the salivary glands of rabid dogs. It is a well known fact that the saliva of rabid animals is very infectious and is the chief agent in the natural transmission of the disease. D. W. Poor and E. Steinhardt,* in their classical work on methods of obtaining the rabies virus from the submaxillary glands, in which I assisted, demonstrated the infectiousness of the gland extract.

Following the accepted methods, I prepared an antigen from the salivary glands.

Upon testing the serum of treated animals with this antigen, following the Wassermann technic, I always obtained a positive reaction. (Experiments 2, 3, 4, 5, 6, 7, 15, 30, 31, 32, 38, 39.)

The serum of animals infected with street virus always gave a positive reaction, usually several days before clinical symptoms became manifest. (Experiments 1, 8, 9, 15, 16.)

A case of natural infection showing typical clinical rabies gave a marked positive reaction. (Experiment 13.)

The serum of one dog from the dog-pound taken as a negative control, gave a positive reaction. This animal showed no clinical symptoms of rabies, but postmortem examination of the brain showed typical Negri bodies. (Experiment 14.)

Some cases showing clinical symptoms

*Read at the meeting of the American Association of Pathologists and Bacteriologists in Philadelphia, April, 1912, and published in the *Journal of Infectious Diseases*, No. 2, Vol. 12, March, 1913.

very closely resembling rabies—dropped jaw, partial paralysis, salivation, typical change of voice, etc., gave negative serum reactions corresponding with postmortem findings, and test animals inoculated with a brain emulsion remained healthy. (Experiments 17, 18, 19, 20.)

All positive reactions in which a postmortem examination was made showed typical Negri bodies. (Experiments 1, 8, 9, 13, 14, 16, 28, 29.) These were verified by two competent observers.

Negative reactions were obtained in the following controls: Normal rabbits, dog, cat, dog with distemper, man. (Experiments 11, 12, 21, 22, 23, 24, 25, 26, 27, 33, 34, 35, 36, 37, 40, 41, 49-58.)

DUMB RABIES
Photographed in the hospital of Dr. J. A. Campbell, Toronto

All animals giving a negative reaction failed to show Negri bodies when autopsied.

Treated animals did not give as marked a reaction as those naturally or experimentally infected.

EXPERIMENTS

A. Experiments on Rabbits

1. Rabbit (15). Inoculated subdurally with positive brain-virus emulsion. The blood was taken on the ninth day after inoculation, at which time the animal showed no symptoms of rabies. The reaction was strongly positive. Two days after the test the rabbit became paralyzed, and was killed. Upon postmortem examination, many Negri bodies were found in the brain, test animals died from inoculation with brain emulsion.

2. Rabbit (7). Treated with rabies virus, producing active immunity, remained healthy, with no clinical symptoms, but gave a strong positive reaction. Killed after the lapse of three months; postmortem examination showed no Negri bodies. Test animals still alive after five months.

3. Rabbit (272). Immunized, passive. Positive reaction. Still living after eight months.

4. Rabbit (273). Immunized, passive, same as 272. Positive reaction. Still living after eight months.

5. Rabbit (275). Immunized, passive. Died from cervical abscess. No Negri bodies. Positive reaction.

6. Rabbit (341). Immunized, active. Still alive after eight months. Positive reaction.

7. Rabbit (344). Immunized, active. Still alive after eight months. Positive reaction.

8. Rabbit (17). Inoculated with street virus; 14 days later, paralyzed. Killed. Many Negri bodies. Test animals died.

9. Rabbit (18). Died 15 days after inoculation with street virus. Negri bodies. Test animals died.

The last two rabbits (Nos. 17 and 18) were tested before inoculation, the serum showing a negative reaction, but as early as the third or fourth day after inoculation, a slight positive reaction could be obtained, which increased with each succeeding day.

10. Rabbit (19). Died the third day after inoculation of cerebral hemorrhage. The blood was examined and showed negative reaction.

NEGATIVE CONTROL

11. Rabbit (20). Not inoculated; negative reaction (negative control).

12. Rabbit (21). Not inoculated; negative reaction (negative control).

I do attach great importance to the results of these rabbit tests, for while in each of these the serum test proved accurate, rabbit serum sometimes has the power to fix complement by using certain antigens; for example, normal rabbit serum will sometimes react with certain syphlytic antigens.

B. Experiments on Dogs

13. Dog (black, water spaniel, 5 months old); brought in alive for examination by Dr. Geo. P. Frost. The dog showed typical clinical symptoms of rabies. I drew off some blood from the jugular vein and made the test the same day. The result was a strongly positive reaction. The postmortem examination of this animal showed typical Negri

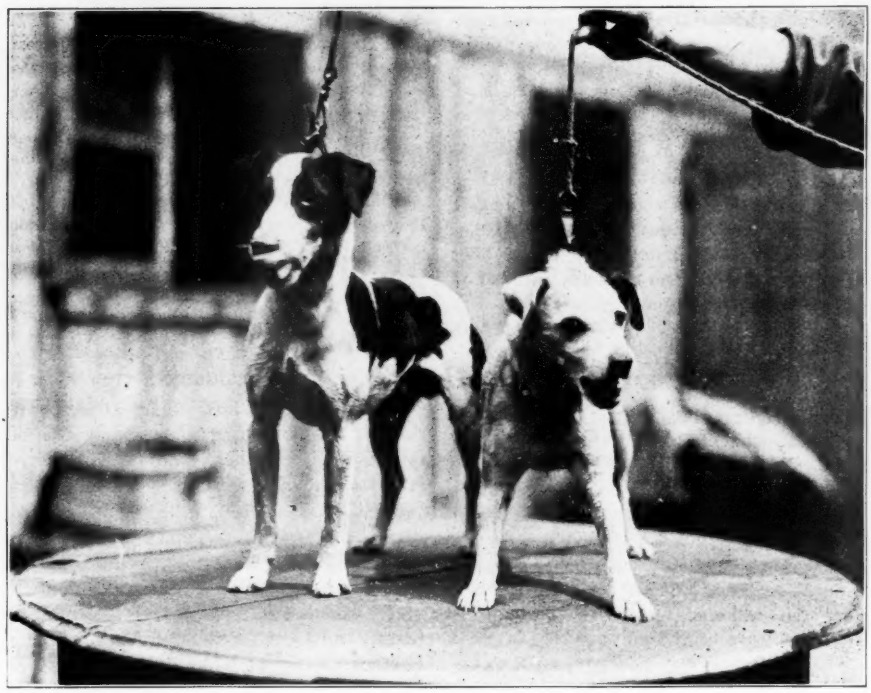
bodies and test animals inoculated with brain emulsion died of rabies.

14. Dog (brindle bull) from the city dog pound; apparently healthy; used for negative control, but the blood test gave a strongly positive reaction. Subsequent brain examination showed typical Negri bodies. This dog was in pens with many others at the dog pound. Test animals died.

15. Dog. (Fox terrier, seven months old.) Inoculated with street virus, and treated. Still alive. Distinctly positive reaction.

18. Dog. (White bull terrier.) Brought in alive for examination by Dr. von Zelinsky. The dog had bitten a boy, and on account of his viciousness, rabies was suspected. Blood test, negative; brain examination, no Negri bodies, and inoculated test animals remained healthy.

19. Dog. (Boston bull.) Brought in alive for examination by Dr. W. Repmann. The dog had bitten a boy and showed symptoms of paralysis and was suspected of having dumb rabies. Blood test, negative. The dog was killed. The brain



TYPICAL CASES OF DUMB RABIES
Photographed in the hospital of Dr. J. A. Campbell, Toronto

16. Dog. (Black and white mongrel.) Inoculated at the same time as the above (fox terrier). Distinctly positive reaction. Not treated. Paralyzed—died. Many Negri bodies, test animals died.

17. Dog. (White fox terrier.) Brought in alive for examination by Dr. W. Repmann. The dog showed symptoms of rabies, salivation, but the blood test gave negative reaction. The dog was killed. The postmortem examination showed no Negri bodies but mechanical pneumonia due to sawdust in the lungs. Test animals inoculated with the brain emulsion from this dog remained healthy.

examination showed no Negri bodies. Test animals remained healthy.

20. Dog. (White French bull.) Brought in for examination by Dr. Geo. Frost. The dog showed marked symptoms of rabies, dropped jaw and beginning paralysis of the hind legs. Blood test, negative. Postmortem examination showed no signs of rabies. Test animals remained healthy.

NEGATIVE CONTROLS

21. Dog. (Black mongrel), from dog pound; healthy dog. Blood test, negative reaction. No Negri bodies.

22. Dog. (White and black), from dog pound,

clinical distemper. Blood test, negative. No Negri bodies.

23. Dog. (Brown) from dog pound; blood test, negative. No Negri bodies.

24. Dog. (Fox terrier), from dog pound; blood test, negative. No Negri bodies.

25. Dog. (Fox hound) from dog pound. Blood test, negative reaction. No Negri bodies.

26. Dog. (Fox terrier, white and black) from dog pound. Blood test, negative reaction. No Negri bodies.

27. Dog. (Black water spaniel) from dog pound. Blood test, negative reaction. No Negri bodies.

C. Experiments in Cats

28. Cat (white). Before inoculation blood test, negative. After inoculation with rabies virus blood test, positive. The cat died from rabies and the postmortem examination showed typical Negri bodies.

29. Cat (gray tiger). Before inoculation blood test, negative. After inoculation with rabies virus, blood test, positive. The cat died from rabies and the postmortem examination showed typical Negri bodies.

30. Cat (red tiger). Inoculated with rabies virus and treated. Still alive after six months. Blood test, positive.

31. Cat (white with black spots). Passively immunized against rabies. Blood test, positive.

32. Cat (white). Passively immunized against rabies. Blood test, positive.

NEGATIVE CONTROLS

33. Cat (gray and black tiger). Blood test, negative reaction.

34. Cat (mouse gray). Blood test, negative reation.

35. Cat (white and gray tiger spots). Blood test, negative reaction.

36. Cat (brown, gray tiger with white spots). Blood test, negative.

37. Cat (black and white). Blood test, negative.

D. Experiments on Goats

38. Goat (4). Actively immunized with rabies virus; in healthy condition, no clinical symptoms; positive reaction. Still alive after eight months.

39. Goat (5). Same procedure as with goat (4). Positive reaction. Still alive after eight months.

NEGATIVE CONTROLS

40. Goat (6). Not inoculated. Blood test, negative reaction.

41. Goat (7). Not inoculated. Blood test, negative reaction.

E. Experiments on Human Serum

42. Serum from a person who has received seven doses of the Pasteur treatment. Blood test, negative reaction.

43. Serum from a person who had received sixteen doses of the Pasteur treatment. Blood test, negative reaction.

44. Serum from a person who has received seventeen doses of the Pasteur treatment. Blood test, negative reaction.

45. Serum from a person who has received twenty doses of the Pasteur treatment. Blood test, negative reaction.

46. Serum from the same person (No. 47), from whom the serum showed no reaction after the seventeenth treatment gave a slight reaction one week after finishing the whole treatment.

47. The serum of the same person (No. 47), but showed a marked reaction three weeks after the last treatment.

48. Serum of Dr. L., who had received the Pasteur treatment August, 1912, after probable infection. Positive reaction June 18, 1913, ten months after treatment.

NEGATIVE CONTROLS

49-58. For negative control the serum of ten normal persons was tested and negative reaction obtained in each case.

CONCLUSIONS

While these tests are but few, they point to the possibility of making a diagnosis of rabies with exactness and in the early stages of the disease by the aid of the complement-fixation test, using for antigen an extract of the submaxillary glands of a rabid dog. I believe by means of this reaction a diagnosis can be made immediately, without destroying the animal, and, further, a test after the completion of the Pasteur treatment will determine whether or not immune bodies are present in the patient's serum, whereby a greater degree of assurance can be given the patient.

The details of further experiments, especially with the blood of persons who have taken the Pasteur treatment, will be given in a subsequent publication.

I wish to thank Dr. J. F. Biehn, director of The Abbott Laboratories, and Dr. Eugene Weber, assistant director of the Chicago Health Department Laboratory, for assistance in verification of results and for material for this work.

Immunization Tests With Glanders Vaccine*

By JOHN R. MOHLER and ADOLPH EICHHORN, Pathological Division, B. A. I., Department of Agriculture

AMONG the diseases of horses with which the veterinary authorities are concerned, glanders is probably the most important, and unless strict measures for its control are enforced the tendency of the disease is to spread more or less rapidly. This fact is due to the character of the disease, to the prevailing methods of caring for horses and probably more important than all, to the frequent latent existence of the disease in apparently healthy animals. The destruction of all infected animals has been accepted as a matter of course in all civilized countries, and owing to the dangerous character of the disease and the possibility of transmission to man, this action appears to be the sanest and most reasonable procedure in its control. On the other hand, the possibility of a method of immunization of healthy animals is worthy of consideration and would be of a wonderful advantage.

Ever since the discovery of the value of mallein as a diagnostic agent for glanders, experiments have been conducted by various investigators relative to its immunizing and curative value. Many favorable reports have been made by veterinarians of the results obtained. On the contrary, others appear to have had no satisfaction from its use.

Since it has been proven that glanders cases may recover it is rather difficult to establish the value of the immunizing agents. Fortunately, we now possess means by which the presence of immune bodies can be demonstrated in the animal upon which attempts at immunization are made. With the serological tests at our command we may control, to some extent, the action of an immunizing substance and observe how long the immune bodies are present in an animal receiving immunization treatment. It is unfortunate, however, that the demonstration of immune bodies does not indicate the degree of immunity in the animals.

We may obtain in glanders immunization an agglutination value of 1 to 5000 or over or a complement fixation with .02 of a Cc. of serum which may continue for a period of several months, yet this same animal which apparently is supplied with a great amount of immune bodies can be readily infected with glanders bacilli. Thus, in tests undertaken for establishing the degree of immunity against glanders in the horse, it is necessary to expose the injected animals to an infection such as occurs under natural conditions. Observations of such animals as to the clinical appearance of the disease and periodical ophthalmic tests with mallein are the methods by which the most accurate results of the immunization tests can be obtained. Serum tests in these cases are of little value as they invariably demonstrate immune bodies or antibodies in the immunized animals since even small quantities of mallein injected into a horse produce antibodies which remain in the blood for three of four weeks.

Curative results from mallein were reported by Leclainche, Hueppe, Nocard, Johne, and Wladimiroff, while its immunizing value against glanders was studied by Schindelka, McFadyean and Semmer, but the results were unsatisfactory. Taking into consideration the bibliography at our command and drawing conclusions from the results obtained it appears that mallein possesses very little immunizing value and no great benefit can be expected from its use as a curative agent.

Other investigators attempted to immunize horses and other animals against glanders by the use of killed glanders bacilli and the literature contains the record of some favorable results from this method

*Presented at the 50th annual meeting of the A. V. M. A., New York, September, 1913.

of immunization. The preparations which were employed for this purpose were in most instances suspensions of glanders bacilli killed by heat. Of the various products which have been prepared and are at the present time used to a limited extent for the immunization of glanders "Farase," so termed by Levy, Blumenthal and Marxer, gives apparently the best results. It is prepared by killing glanders bacilli with eighty percent glycerin or with ten percent urea. The bacilli are then dried and the substance is used in that condition for the immunization and does not contain living bacteria. Favorable results were obtained with Farase by Machodin and Bautz, and Dediulin. The results of Dediulin are probably the most remarkable since he reports that on an estate where previous to immunization 276 glandered animals had been destroyed, he injected 303 animals and after one year and four months not a single case of glanders developed, although in the meanwhile fourteen cases of glanders developed among 300 non-immunized animals.

Machodin and Bautz subjected Farase to various tests to establish its immunizing value. Their results on guinea pigs, cats, and horses were very satisfactory. Guinea pigs which were given two injections of Farase resisted six weeks later an intraperitoneal infection with 1-2500 and 1-5000 mg. of glanders bacilli. Of six horses which received two immunizing injections of Farase, two were given 1-2500 mg. of glanders bacilli subcutaneously, two received 1-500 mg. of glanders bacilli per os, and two were exposed with the other animals forty-five days after the second injection. For each of the groups one check was used.

Postmortem examination of the check animals four to five weeks after the infection, showed typical glanders, while the two immunized animals which received subcutaneous injections of glanders bacilli failed to show any lesions of the disease. No record was obtained of the four remaining immunized animals, as they were turned over to another laboratory for study of the duration of immunity in these horses.

One of the recent works on the immunization of glanders was published by Zurkan who studied the formation of specific antibodies in the blood of horses under the action of glanders antigens. He concludes that of various antigens such as Farase, killed glanders bacilli, mallein and malleo-aggressin, Farase and malleo-aggressin proved the most active in the production of immune bodies. The degree of immunity in the animals was established by Zurkan from the comparative results of the serological reactions he obtained with the complement fixation, agglutination, precipitation and opsonic tests. Since there were no practical tests made on these animals, his statement that malleo-aggressin may be used for the immunization of horses against glanders can not be accepted as conclusive.

At our last meeting of the A. V. M. A. in Indianapolis, McKellar presented his conclusions on the protective effect of glanders vaccine.

The proportion of infections in the stables where these outbreaks occurred as indicated by the agglutination test is astonishing. As there is no mention made in the article of the time the agglutination tests were applied subsequent to the mallein test, it suggests that the large proportion of reactors to the agglutination test were the results of the mallein injection and not due to the presence of the infection. If this be true then the effect of the vaccine remains indefinite and the control of the disease must be accredited to the other precautions which were observed.

At best it will require several years before the value of any method of immunization can be satisfactorily established. The New York City Board of Health has been conducting immunizing experiments with a vaccine prepared in their laboratory, consisting of a suspension of dried glanders bacilli. Each cubic centimeter of the suspension contains 2 mg. of dried Bacilli.

Through the courtesy of Dr. William H. Park, director of the laboratory, a sufficient quantity of such vaccine was obtained for conducting a series of investigations relative to the possibility of conferring immunity to animals injected with this vaccine

The experiments were made on guinea

pigs and on horses. Twenty guinea pigs about 600 grams in weight were divided into four groups, four pigs of each group receiving three immunizing injections of a definite amount of vaccine at intervals of one week. The size of the doses and same strain of glanders bacilli was used for the injections.

The fifth pig in each group was not vaccinated but served as a check, receiving only a corresponding quantity of glanders bacilli. The results of the tests in guinea

TABLE I

IMMUNIZATION TESTS WITH GLANDERS VACCINE IN GUINEA PIGS

Group	No. G. Pigs	Date of First Vaccina.	Amounts Injected			Date of Injection	Amount of Injection	Date of Death	Bacteriological Results
1	1	19-V-13	0.1 Cc.	0.3 Cc.	0.5 Cc.	10-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 28-VI-1913.....	B. Mallei recovered.
	2	19-V-13	0.1 Cc.	0.3 Cc.	0.5 Cc.	17-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 14-VII-1913.....	B. Mallei recovered.
	3	19-V-13	0.1 Cc.	0.3 Cc.	0.5 Cc.	24-VI-13	Dilution of Bacilli in 20 Cc. bouillon....	Died 28-VII-1913.....	B. Mallei recovered.
	4	19-V-13	0.1 Cc.	0.3 Cc.	0.5 Cc.	1-VII-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 20-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
2	1	19-V-13	0.3 Cc.	0.5 Cc.	0.8 Cc.	10-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 12-VII-1913.....	B. Mallei recovered.
	2	19-V-13	0.3 Cc.	0.5 Cc.	0.8 Cc.	17-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Killed 16-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
	3	19-V-13	0.3 Cc.	0.5 Cc.	0.8 Cc.	24-VI-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 20-VIII-1913...	B. Mallei recovered.
	4	19-V-13	0.3 Cc.	0.5 Cc.	0.8 Cc.	1-VII-13	Dilution of Bacilli in 20 Cc. bouillon....	Died 13-VIII-1913....	B. Mallei recovered.
3	1	19-V-13	0.6 Cc.	0.9 Cc.	1.2 Cc.	10-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 16-VII-1913.....	B. Mallei recovered.
	2	19-V-13	0.6 Cc.	0.9 Cc.	1.2 Cc.	11-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 24-VII-1913.....	B. Mallei recovered.
	3	19-V-13	0.6 Cc.	0.9 Cc.	1.2 Cc.	24-VI-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 16-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
	4	19-V-13	0.6 Cc.	0.9 Cc.	1.2 Cc.	1-VII-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 26-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
4	1	19-V-13	1 Cc.	1.5 Cc.	2 Cc.	10-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 5-VII-1913.....	B. Mallei recovered.
	2	19-V-13	1 Cc.	1.5 Cc.	2 Cc.	17-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Killed 16-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
	3	19-V-13	1 Cc.	1.5 Cc.	2 Cc.	24-VI-13	Dilution of Bacilli in 20 Cc. bouillon....	Died 2-VIII-1913.....	B. Mallei recovered.
	4	19-V-13	1 Cc.	1.5 Cc.	2 Cc.	1-VII-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 20-VIII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
Checks	1	Not Vaccinated				10-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Died 8-VII-1913.....	B. Mallei recovered.
Checks	2	Not Vaccinated				17-VI-13	Dilution of Bacilli in 10 Cc. bouillon....	Killed 28-VI-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
Checks	3	Not Vaccinated				24-VI-13	Dilution of Bacilli in 20 Cc. bouillon....	Killed 5-VII-1913 on account of extensive supp. abscesses.....	B. Mallei recovered.
Checks	4	Not Vaccinated				1-VII-13	Dilution of Bacilli in 20 Cc. bouillon....	Died 3-VIII-1913.....	B. Mallei recovered.

1. The immunizing injections were given at 7-day intervals.
2. All injections were made subcutaneously.
3. 0.5 Cc. of suspension in 10 Cc. or 20 Cc. bouillon containing 1 loopful of surface growth from agriculture.

other details are graphically presented in Table I. After the conclusion of these vaccinations one pig from each group was subjected to infection with suspensions of glanders bacilli. These injections with infectious material were administered at various intervals. In all instances the pigs show that not even an increased resistance was present in the vaccinated guinea pigs. It is to be regretted that in the infection of these pigs, probably too large a quantity of glanders bacilli was used. On the other hand, it would appear that if there had been any immunity pres-

ent in the vaccinated guinea pigs they would have manifested it by a greater resistance against the infection than the check pigs. This, however, was not the case.

In the experiments conducted on horses, seventeen animals were used which were purchased on the open market. Most of the animals were aged, but otherwise in fair condition. All horses were subjected to the agglutination, complement-fixation and the ophthalmic mallein tests, prior to the vaccination. All of the horses proved free from glanders on all of these tests. Since the amount of vaccine to be injected for immunizing purposes has not been established, it was deemed advisable to employ varying quantities for the injections in the different horses, and in order to determine the resistance of the animals against infection during and after the vaccination they were subjected to exposure at different times during the investigation.

The smallest amount of the suspension used for the vaccination was the quantity recommended by the New York City Board of Health; viz., 1 Cc., 3Cc., and 5 Cc. per injection, while the largest amount any of the horses received was 4 Cc., 8 Cc., and 12 Cc., respectively. Two of the vaccinated horses received an infection on the nasal mucosa with glanders bacilli, taken up on the end of a platinum loop, one week after the last vaccination. Both of these horses promptly developed glanders and one of them, No. 102, died of an acute form of the disease twenty-one days after the infection. Thus, there appeared to be no resistance or at least no increased resistance against artificial infection.

To establish the resistance of the vaccinated animals against contact infection, a corral was built where all the animals including two artificially infected glanders cases were kept. They were fed in common feed boxes and were watered from a common trough. Only one hay rack was used for all animals. Simultaneously with this exposure a stable with three stalls was likewise used for exposing the horses. The construction of the stalls in this stable was such that the animal in the center could reach to the feed boxes of either of the horses in the side stalls. The horse placed in the center was a good discharging case of clinical glanders, whereas the horses placed in the side stalls were either two immunized animals or two controls, all of which were given one week's exposure with this infected horse. This was accomplished by changing the horses in the two side stalls every week, and bringing in two others from the corral, so as to make the exposure as uniform as possible in all animals including the checks. The conditions of exposure were apparently severe yet they did not exceed the exposure which occurs in the stables of large cities where the sanitary conditions are very poor and where poor light and ventilation afford a splendid opportunity for the propagation of the disease. In fact, the exposure in the corral was rather slight since the sunlight no doubt had a destructive effect on the infection.

All animals were subjected periodically to clinical examinations and only one of the vaccinated horses has developed signs of the disease up to the present time, although some of them have been exposed since May 16th. Horse No. 99 which received four immunizing injections and was exposed to a discharging case of glanders in the stable, died fifteen days after the exposure from acute broncho-pneumonia malleosa.

In order to determine whether any of the vaccinated horses were infected with the latent form of the disease, all were subjected July 23rd to the ophthalmic test. This gave surprising results. Two of the vaccinated animals gave a marked reaction (P+++). A similar reaction was also obtained in the affected horses used for exposure, while of the two check animals which were not vaccinated but had been exposed to a similar extent as the vaccinated animals, only one responded to the eye test; the other check animal failed to give any reaction. One month later all horses in the experiment were again subjected to the ophthalmic test. The results were the same as on the previous test. At this time it was noted that the intensity of the reaction was not as pronounced as in the first test. The inflammation and amount of purulent discharge were somewhat less than in the previous test. This observa-

tion coincides with that of Meyer who states that after several eye tests in positive cases of glanders the degree of the reaction becomes less distinct.

The detailed account of the results of the immunizing tests in horses is given in Table II.

In order to study the effect of the immunizing injections on the serum tests, the blood of the horses in this experiment was subjected to the agglutination and complement-fixation tests from the time of the first injection until the conclusion of the work. It was found that the agglutination value of the serum of the vaccinated horses as a rule increased from the third day after the first vaccination and continued to rise for a time. A decrease was again noted from two to four weeks after the last vaccination and appeared practically normal after six weks to two months. A complement-fixation with the sera of the vaccinated horses was obtained from the seventh to the ninth day after the first vaccination and they continued to give positive fixations from two to three months after the last vaccination.

These serological results appeared only in the animals which gave no reaction to the ophthalmic test, while the blood of those vaccinated horses which gave a positive reaction to the eye test continued to give a positive fixation until they had been destroyed and proved to be affected with

TABLE II

IMMUNIZATION TESTS WITH GLANDERS VACCINE IN HORSES

Horse	Amounts and Dates of Vaccination 1	2	3	4	Date of Exposure	Ophthalmic Tests July 23	Aug. 23	Postmortem	Remarks
99	1 Cc. 28-III-13	3 Cc. 4-IV-13	5 Cc. 11-IV-13	8 Cc. 25-IV-13	16-V-13			Acute Glanders	Died May 31, 1913.
107	28-III-13	4-IV-13						Impaction	Died April 21, 1913.
86	28-III-13	4-IV-13	11-IV-13	25-IV-13	16-V-13	—	—		Still under observation.
102	28-III-13	4-IV-13	11-IV-13		Infected Apr. 18 with B. Mall.			Acute Glanders	Died May 9, 1913.
111	28-III-13	4-IV-13	11-IV-13		Infected Apr. 18 with B. Mall.	P+++	P++		First clinical symptoms of glanders appeared Apr. 23, 1913. Still under observation.
110	28-III-13	4-IV-13	11-IV-13	25-IV-13	16-V-13	—	—	Showed no lesions of glanders.	Killed Aug. 20, 1913. No clinical signs of glanders.
105	28-III-13	4-IV-13	11-IV-13	25-IV-13	16-V-13	P+++	P++	Lungs showed typical glanders nodules.	Killed Aug. 20. No clinical signs.
117	2 Cc. 2-V-13	4 Cc. 9-V-13	8 Cc. 16-V-13		16-V-13	—	—		Still under observation.
118	2-V-13	9-V-13	16-V-13		21-V-13	P+++	P++	Lungs showed numerous glanders nodules.	Killed Aug. 20, 1913. No clinical signs of glanders.
119	2-V-13	9-V-13	16-V-13		28-V-13	—	—		Still under observation.
120	2-V-13	9-V-13	16-V-13		21-V-13	—	—	No lesions of glanders.	Killed Aug. 20, 1913. No clinical signs of glanders.
123	4 Cc. 20-V-13	8 Cc. 27-V-13	12 Cc. 24-VI-13		20-VI-13	—	—		Still under observation.
124	20-V-13	27-V-13	24-VI-13		20-VI-13	—	—	No lesions of glanders.	Killed Aug. 20, 1913. No clinical signs of glanders.
94	Was not Vaccinated				16-V-13	P+	P+	Lungs showed numerous typical glanders nodules.	Killed Aug. 20, 1913. No clinical signs of glanders.
121	Was not Vaccinated				20-V-13	—	—		Still under observation.
82	Infected 21-III-13 and used for exposure to other horses					P+++	P++		First clinical symptoms of glanders appeared March 26, and continued to progress.
122	Infected 22-V-13 and used for exposure to other horses					P+++	P++		First clinical symptoms of glanders appeared May 26, 1913, and continued to progress.

TABLE III

SERUM REACTIONS IN NORMAL HORSES FOLLOWING THE SUBCUTANEOUS INJECTION OF I Cc. OF MALLEIN

Horse No.		Jan. 31 3 days	Feb. 3 6 days	Feb. 6 9 days	Feb. 9 12 days	Feb. 13 16 days	Feb. 17 20 days	Feb. 20 23 days	Feb. 23 26 days	Feb. 27 30 days	Mar. 3 34 days	Mar. 6 37 days	Mar. 10 41 days	Mar. 13 44 days	Mar. 17 48 days	Mar. 21 52 days	Mar. 24 55 days
96	Comp.-Fixation	.1 .2 — —	.1 .2 — —	.1 .2 — Sl+	.1 .2 — Sl+	.1 .2 Sl+ ½+	.1 .2 Sl+ Sl+	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —
	Agglutination	1:500—	1:800	1:800	1:800	1:800	1:500	1:600	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—
98	Comp.-Fixation	.1 .2 — —	.1 .2 — —	.1 .2 — Sl+	.1 .2 ¾+ +	.1 .2 + +	.1 .2 + +	.1 .2 ¾+ ¾+	.1 .2 ¾+ ¾+	.1 .2 Sl+ ½+	.1 .2 Sl+ ½+	.1 .2 Sl+ ½+	.1 .2 Sl+ ½+	.1 .2 Sl+ Sl+	.1 .2 Sl+ Sl+	.1 .2 — —	.1 .2 — —
	Agglutination	1:800	1:2000	1:1500	1:1500	1:2000	1:2000	1:1500	1:2000	1:1500	1:1000	1:1000	1:1000	1:800	1:800	1:500—	1:500—
102	Comp.-Fixation	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — Sl+	.1 .2 Sl+ ½+	.1 .2 Sl+ ½+	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —
	Agglutination	1:600	1:1000	1:1000	1:1000	1:1000	1:800	1:1000	1:800	1:800	1:600	1:800	1:600	1:600	1:500—	1:500—	1:500—
103	Comp.-Fixation	.1 .2 — —	.1 .2 — —	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 ¾+ ¾+	.1 .2 ¾+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 Sl+ ½+	.1 .2 Sl+ ½+	.1 .2 Sl+ Sl+	.1 .2 — Sl+	.1 .2 — —
	Agglutination	1:500—	1:800	1:1000	1:1000	1:800	1:800	1:600	1:500	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—
107	Comp.-Fixation	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —
	Agglutination	1:800	1:1000	1:1500	1:1500	1:2000	1:1500	1:1500	1:1000	1:1000	1:1000	1:1000	1:1000	1:800	1:800	1:800	1:500—

HORSES 96, 98 and 103 RECEIVE A SECOND INJECTION OF I Cc. OF MALLEIN MARCH 28, 1913

Horse No.		Mar. 31 3 days	Apr. 3 6 days	Apr. 7 10 days	Apr. 10 13 days	Apr. 14 17 days	Apr. 17 20 days	Apr. 21 24 days	Apr. 24 27 days	Apr. 28 31 days	May 1 34 days	May 5 38 days	May 8 41 days	May 12 45 days	May 15 48 days	May 19 52 days	May 22 55 days	June 67 days
96	Comp.-Fixation	.1 .2 — —	.1 .2 Sl+ Sl+	.1 .2 Sl+ Sl+	.1 .2 ½+ ½+	.1 .2 Sl+ Sl+	.1 .2 Sl+ Sl+	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —	.1 .2 — —
	Agglutination	1:500—	1:500—	1:600	1:800	1:500—	1:500—	1:600	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—	1:500—
98	Comp.-Fixation	.1 .2 — —	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ½+	.1 .2 — —
	Agglutination	1:800	1:1500	1:2000	1:2000	1:1500	1:1500	1:1500	1:1000	1:800	1:600	1:600	1:600	1:600	1:600	1:600	1:500—	1:500—
103	Comp.-Fixation	.1 .2 — —	.1 .2 ½+ +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.2 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 + +	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ¾+	.1 .2 ½+ ½+	.1 .2 — —
	Agglutination	1:600	1:1500	1:2000	1:2000	1:2000	1:2000	1:2000	1:1000	1:1000	1:800	1:800	1:800	1:800	1:800	1:600	1:500—	1:500—

Quantities of serum employed in complement-fixation tests 0.1 Cc. and 0.2 Cc.
Fractions represent the approximate degree of fixation as compared with complete fixation; Sl+ indicates slight fixation.
Six dilutions of sera employed in agglutination test; 1:500; 1:600, 1:800, 1:1000, 1:1500 and 1:2000.

the disease. The same condition was observed in the animals which had been artificially infected with glanders.

The serological results from these investigations appear to have a great significance with reference to the immunity produced by the injection of dead glanders bacilli. The fact that the demonstration of the presence of immune bodies in the vaccination horses ceased entirely in two or three months from the last vaccinated would indicate that after the lapse of such a time the animals have very little or no immunity against the disease. This is further substantiated also by the agglutination value of the sera returning to the normal level. As a matter of fact, previous investigations carried out by Doctor Buck of this laboratory, showed that one or two subcutaneous injections of mallein will give a complement fixation which may last from one to two months. The agglutination value of the serum of such animals is also markedly influenced by subcutaneous malleinization. The serum reaction of horses following the subcutaneous injections of mallein is given in detail in Table III. Thus, it seems that a mallein injection has almost the same action on the production of immune bodies in a horse as killed glanders bacilli. Table IV indicates the results obtained with the agglutination and complement-fixation tests in the animals used in this investigation.

On August 20th two vaccinated horses as well as one check animal, which gave positive reaction to the eye test were destroyed, and in all three animals, marked pulmonary glanders was observed. Horse No. 105 showed the presence of glanders nodules in the lungs in very great numbers, some of which were of the size of a walnut. In the two other cases, while the nodules were very numerous and from their appearance appeared to be active, they were of smaller sizes ranging from a pin head to the size of a pea. Horses Nos. 110, 120 and 124 were killed on the same day, although they had failed to show any indication of glanders by the eye test, which was also substantiated by the complement-fixation test with the blood of these animals. Postmortem examination showed no signs of glanders in these animals.

All the other animals used in these experiments are still under observation as it is deemed advisable to give them additional exposure in order to determine whether they possess an immunity to the disease.

The results obtained by these investigations appear to be sufficient to demonstrate the unsatisfactory results of this method of immunization. Of the immunized animals, three contracted the disease from natural exposure, which is a large proportion when it is considered that all animals were aged and kept most of the time during the exposure out of doors. On the other hand, the fact that of the two check animals, only one contracted the disease, is additional evidence of the moderate character of the exposure which further suggests the ineffectiveness of the immunization. In artificial infections of the vaccinated animals they showed no resistance whatsoever, as both vaccinated horses promptly developed an acute form of the disease from touching the Schneiderian membrane with a platinum loop which has been touched to a growth of glanders bacilli. Thus, for the present it seems advisable to abstain from immunizing horses by this method, as a practice of this kind may do more harm than good. Owners having horses which are supposedly immunized would naturally become careless thinking their animals were resistant to the disease and thus even a better opportunity would be offered for the propagation of the disease than if the horses were not vaccinated. Furthermore, the fact that the blood of vaccinated animals cannot be utilized for serum tests for two to three months after the injections is also a great disadvantage in the eradication of the disease.

As a result of this preliminary work it appears that the control and eradication of glanders must still be dependent upon the concentration of our efforts in eliminating infected horses and the adoption of proper precautions agains the introduction of infected animals into stables

TABLE IV

SERUM REACTIONS IN HORSES VACCINATED AGAINST GLANDERS

Horse	Vaccination Period	Agglutination								Complement-Fixation with 0.1 & 0.2 of Serum								Remarks
		During Vaccination Period			After Vaccination					During Vaccination Period			After Vaccination					
		At first vaccination	2nd week	4th week	2nd week	4th week	6th week	8th week	12th week	At first Vaccination	2nd week	4th week	3rd week	6th week	8th week	10th week	12th week	
99	28-III-13 to 25-IV-13	1:400—	1:2000+	1:2000+	1:2000+					—	+	+	+					Died May 31 from acute glanders and influenza.
86	28-III-13 to 25-IV-13	1:400—	1:2000+	1:2000+	1:1500	1:1000	1:800	1:400—	1:400—	—	+	+	—	—	—	—	—	
110	28-III-13 to 25-IV-13	1:400—	1:1500	1:2000+	1:2000+	1:1000	1:400—	1:400—	1:400—	—	+	+	+	+	—	—	—	Still under observation.
105	28-III-13 to 25-IV-13	1:400	1:2000	1:2000+	1:2000+	1:1500	1:800	1:2000	1:2000+	—	+	+	+	+	+	+	+	Postmortem showed pulmonary glanders.
117	2-V-13 to 16-V-13	1:400—	1:2000	1:2000+	1:2000+	1:1000	1:400	1:400—	1:400—	—	+	+	+	—	—	—	—	Still under observation.
118	2-V-13 to 16-V-13	1:400	1:2000	1:2000+	1:1500	1:1500	1:800	1:1500	1:2000	—	+	+	+	+	+	+	+	Postmortem showed pulmonary glanders.
119	2-V-13 to 16-V-13	1:400—	1:1500	1:2000+	1:1500	1:1000	1:400	1:400—	1:400—	—	+	+	+	+	+	+	—	Still under observation.
120	2-V-13 to 16-V-13	1:400	1:2000	1:2000+	1:2000+	1:1500	1:800	1:400	1:400	—	+	+	+	+	—	—	—	Postmortem showed no signs of glanders.
123	20-V-13 to 24-VI-13	1:400	1:2000	1:2000+	1:2000	1:1500	1:1000		1:400	—	+	+	+	+			—	Still under observation.
124	20-V-13 to 24-VI-13	1:400	1:1500	1:2000	1:2000	1:1500	1:800		1:400	—	+	+	+	—			—	Postmortem showed no signs of glanders.
		Before exposure	After exposure							Before exposure	After exposure							
94	Unvaccinated check infected by exposure	1:400—	1:400	1:800	1:1500	1:2000	1:1500	1:800	1:1000	—	—	+	+	+	+	+	+	Postmortem showed pulmonary glanders.
		Before exposure	After exposure															
121	Unvaccinated check remained healthy	1:400	1:400	1:400	1:400	1:400	1:400	1:400	1:400	—	—	—	—	—	—	—	—	Still under observation.

free from the disease. By these methods the results achieved in Germany, Austria and Canada have proved very encouraging, and no doubt if executed in the same spirit in this country, a marked reduction in the cases of glanders would result.

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Mammitis or Mastitis in Cows

By GEORGE LOCKWOOD, M. R. C. V. S., Peterborough, England

(*Concluded from last month*)

Gangrenous Inflammation of the Udder

Considering the varying virulence of the infectious material, it is not surprising that gangrene sometimes occurs. This form of the disease is commonest in sheep, though it always occurs in cows. The nature of the specific poison is at present little understood. Nocard isolated a micrococcus from the udder of a sheep affected with gangrenous mastitis, pure culture of which, injected into the mammary duct of healthy sheep, always reproduced the disease, but in other animals only caused slight swelling.

Symptoms and course. The disease starts as a very acute parenchymatous mastitis with severe general symptoms; high fever, loss of appetite, great weakness, severe pain and stiff straddling gait, which latter first directs attention to the udder. Local examination first reveals bluish violet spots in the skin, which on palpation are found to be very soft, insensitive and often abnormally cool. These spots quickly spread. They are surrounded by an inflammatory swelling, which may extend to the lower part of the abdomen and the thigh. The animal stands with the back arched and the hind legs straddled, exhibiting acute pain, and after a short time display well marked symptoms of septicemia. Not infrequently death occurs in a comparatively short time. In exceptional cases the local process is limited, a dissecting inflammation sets in, which separates the necrotic tract and may result in recovery; this is, however, a rare exception, the greater number of animals die from septicemia.

Prognosis is unfavorable, for in many cases not even the sacrifice of the udder can save the animal's life.

In treatment of the purulent and gangrenous form of mastitis, the first point is to prevent infection, or combat it if already existing. The greatest care is required in using milk tubes, probes, etc., introduced into the milk canals. If the disease becomes enzootic, and especially if it takes on the gangrenous form, isolation of the affected cows and disinfection of the stalls is absolutely necessary, it is also advisable to have the affected cows under the special care of one attendant, who has nothing to do with the other milking cows. In purulent mastitis occurring enzootically similar precautions are necessary. Some observers believe that the outbreak of this disease is intimately connected with the use of old, bad straw. The diseased milk should be most carefully removed from the premises, the milk being drawn into a pail kept specially for the purpose and not milked on the floor. Frequent milking of the diseased

quarter is just as necessary, for the increase of infectious material occurs chiefly in the milk. Provided the udder is not too sensitive, it should be gently rubbed and kneaded to favor the discharge of inflammatory products from the acini of the gland. The milk syphon is of little use on account of its becoming stopped by clots. The diet should be of such a character as to reduce milk secretion to a minimum. For this purpose purgatives such as sulphate of soda may be used, and under certain circumstances bleeding may be resorted to. The remaining points are to destroy or render inocuous infective material in the udder, and to combat inflammatory changes. The former may be effected by injecting antiseptics, though practitioners hold very different views as to their action; some advise their use, while others consider them of no particular value. In gangrenous inflammation they are generally too late and without effect, but on the other hand they are often very useful in the purulent form. Their effect clearly depends on what tissues require disinfection, though they can penetrate the galactophorous sinuses and large milk ducts, they fail to reach the fine milk ducts and alveoli. A 4oz. solution of boracic acid is generally recommended, or a solution of chinosol (15 grs. to the pint), the injection being distributed through the gland as much as possible by cautious manipulation and allowed to remain in the udder for ten or fifteen minutes. Some veterinary surgeons have had good results. Other injections are also used for this purpose, such as a two percent solution of alum, or a two and a half percent solution of carbolic acid.

In purulent mastitis, warm poultices or fomentations and wrapping the parts in cotton wool will assist in decreasing inflammation. Bang recommends linseed or oatmeal poultices, and the application of woolen cloths wrung out of hot water and kept warm by covering with mackintosh. Fomentation with diluted alkali or soap and water have often been recommended. Once tension and pain diminish, the parts may be smeared with flour paste and covered with wadding. At this stage the application of antiphlogistine or some such preparation, afterwards covering with cotton wool is very often followed by beneficial results. A mixture of two tablespoonfuls of water, four of starch, twenty of glycerine, and one of turpentine is also a good application in these cases. When warm, the mass forms a paste, which is applied thickly and left on for fourteen days. From time to time it may be removed to allow of massage, which is of considerable assistance in this disease. Cold is considered by experienced practitioners to be badly borne—a conclusion warranted by the nature of the disease. The gentle rubbing in of unirritating fats is also useful; or a mixture of equal parts of mercurial ointment, soft soap and lard has a good effect in many cases. As soon as an abscess appears under the skin it should be opened and the cavity cleansed and disinfected. Local induration can often be dispersed by careful massage, though this is of little value when the swelling is of old standing. In gangrenous mastitis early incision into the necrotic parts and the application of antiseptics are alone serviceable. If the process has made much progress, even this treatment seldom suffices and the animal's life can only be saved by amputation of the diseased portion or of the whole udder; but this operation is seldom performed owing to the fact that in the majority of cases when the occasion for such drastic interference arises the affected animal is not in a sufficiently strong physical condition to withstand the severe shock of the operation. It sometimes happens that in gangrenous mastitis the general symptoms are not very severe, and in course of time the affected quarter or quarters slough right out. During the time this process is going on it is necessary to keep the patient in a clean loose box, and apply antiseptic lotions liberally and often to the affected parts.

I feel that a paper on this subject would be quite imcomplete if I should conclude without making some reference to that form of mastitis caused by tubercular infection, which at this particular time is of such great interest and importance to us all.

At the same time I shall be very brief in my remarks, as I fear I have trespassed on your time as far as I dare already.

Tuberculosis of the udder may appear as a first and single symptom of tuberculosis in cows which are otherwise quite healthy, although it is much more frequently a secondary infection. It appears in the first stages as a diffuse, painless and comparatively firm swelling, usually of one quarter, and as a rule one of the hind quarters. More rarely it may appear in two quarters at the same time. The milk is at first normal, but in a comparatively short time, usually about a month, it becomes thin and watery, and mixed with flakes, and sometimes, though by no means always, the milk contains tubercle bacilli. It is quite possible to search in vain for the tubercle bacillus in the milk of cows which are thoroughly infected with tuberculosis. Bollinger proved that milk from the udder of tuberculosis cows was undoubtedly infectious in fifty-five percent of cases, although the demonstration of the tubercle bacilli in such infected milk succeeded only once in twenty cases. The swollen parts of the udder become more and more indurated, until at last they are almost as hard as a stone. The process frequently spreads from the hind to the front quarter of the udder, and the supramammary lymph glands often become greatly enlarged.

—*The Veterinary News.*

The Veterinarian in the National Guard

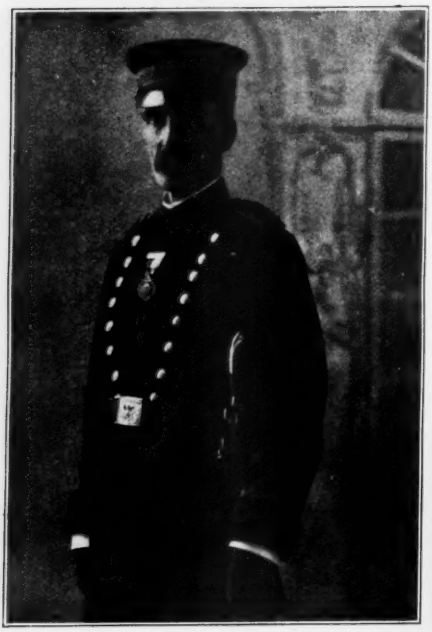
By GARRISON STEELE, M. D., D. V. M.

THE editor of VETERINARY MEDICINE has asked me to discuss three phases of this subject: first, the defective situation of the veterinarian in the national guard at present and the reason for it; second, the better conception of the place the profession should occupy in the state militia; third, how the awkward position in which the veterinarian is placed can be altered.

If one looks for the official standing of the veterinarian in the national guard, he finds much variance in the different states. In Illinois, for example, there are at least two veterinarians who hold commissions in the state militia—the more conspicuous of whom is Dr. S. S. Baker, of Chicago, a brother of Dr. A. H. Baker, Dean of the Chicago Veterinary College, who, by special grant of the legislature, has been for years a veterinary captain in the 1st cavalry. In Massachusetts, the esteemed Dr. Austin Peters was veterinarian of militia with the rank of captain from 1891 to 1901. And in other states like Pennsylvania, Connecticut, and, I think, Michigan, official standing has, I believe, been given the veterinarian in the national guard. However, in many states, the veterinarian has little or no official standing amongst the guardsmen. This is all the more embarrassing to our profession when we remember how the regiments are officered, mostly by selections made by the citizen-soldiers themselves, or indirectly by political influence amongst the state officials or people. The omission to commission veterinarians is all the more obvious in view of the fact that the militia organizations pattern after the regular army military organization. What obtains in the officering of the regular army, therefore, is likely to obtain in the militia. This explains the variance we have remarked upon in the official standing, or lack of it, of the veterinarian in the militia regiments. In some states, where the veterinarian has become strong in politics, commissioned rank has been granted him in the militia; in others not. The true explanation for the defective situation of the veterinarian in the national guard is to be found in the defective situation of the veterinarian in the regular army. The state militia organization simply followed suit. When it came to imitation for officering the commands the militia found, in the case of the veterinarian, nothing to copy in the regular army—no standards allowed; no ideals permitted for our profession.

Still the militia is not to be blamed for this; we have only ourselves to blame There was a better conception of the place the veterinarian should occupy in the state militia which we should have striven to

make actual. The states, in the formation of law which concerns us, tend to pattern after the federal government. When a Federal Pure Food Law was passed, speedily every other state passed laws



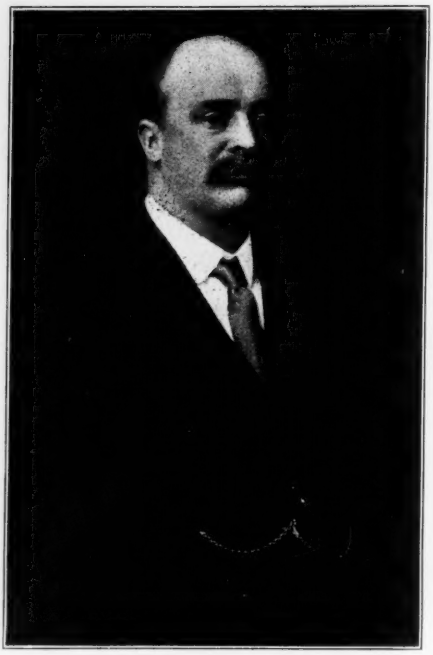
S. S. BAKER, D. V. S.
Veterinarian with the Rank of Captain, 1st Cavalry, Illinois National Guard

Dr. Baker, a prominent practitioner in Chicago, was commander of a cavalry troop, that is, a captain, in the Illinois National Guard from 1899 to 1901. When at that time the state legislature passed a law forming a cavalry regiment, provision was made in the statute for a veterinarian with the rank of captain, Dr. Baker was given the office and has retained it ever since.

patterned after it. Now a federal law covering the manufacture of Biological Products is in force, soon each state will have a similar statute. They fill the gap the federal law cannot cover. The state militia, in the laws which establish them and maintain them, and in the practice of officering the national guard, are in a sorry plight when the veterinarian is under consideration: for, federal law touching the regular army veterinarian being lacking, they have nothing after which they can pattern. If the Hay bill (H. R. 4541, to commission veterinarians in the U. S. Army) passes, there will be immediate results in the militia of the states—they will follow the precedents established for them. The net gain to the profession will be worth the fight it is carrying on to bring about this reformation. For, not only will the veterinarians in the regular army become commissioned officers, but all veterinarians in the cavalry and artillery regiments in the national guard, of every state, as well. The total amount of veterinary commissioned officers in both will be very large. This but illustrates again the immense profit the commissioning of the regular army veterinarians will be to the profession as a whole.

We have here, then, another advantage to the profession in pushing our bill now before Congress. The awkward position in which the veterinarian is placed in the national guard can be altered by the passing of the Hay bill. First, we must establish a standard for the veterinarian in the

(*Continued on page 664*)



AUSTIN PETERS, M. R. C. V. S.
For ten years Veterinarian with the Rank of Captain, Massachusetts National Guard

Dr. Peters, now a practitioner in Jamaica Plain, Mass., was between 1891 and 1901 veterinarian with a captain's commission in the Massachusetts militia. He staunchly supports the idea that veterinarians should be given commissions in the cavalry and artillery regiments in all the states.

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This delay in renewing subscriptions complicates matters greatly in the office of publication, increasing many-fold the labor involved in mailing the journals and in making the necessary changes in our mailing list. The wrappers for VETERINARY MEDICINE are addressed on an addressing machine, by a firm which addresses the wrappers for about two hundred publications. This system seems best to make sure that every wrapper is certainly and properly addressed, and it is convenient when matters are as they should be, when there is but one batch of changes in stencils to make in a month. But the company that addresses these wrappers is located eight miles from the office of VETERINARY MEDICINE, and it is as much work for us to change a dozen name-stencils as it is to change five hundred. And, again, magazines must be taken to the post office for mailing, not dropped in a street letter box, as may be done with a letter, and this requires a messenger or an express wagon to be sent a distance of seven miles every time a batch of delayed renewals come in and the missing numbers of the journal are sent them.

Frankly, this is a plea for prompt renewals (or notices of discontinuance, if you must discontinue your subscription) for our own convenience; to avoid annoyance, a sure delay and a possible failure to secure certain numbers on your own part; and to help us, as it will, to give you a whole lot better

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The whole profession is judged by the average of its members; sometimes by the acts of those who are distinctly below the average, and of those members of the profession who are not subscribers to VETERINARY MEDICINE the majority *are* below the average. If a practitioner in your locality performs a painful operation without anesthesia this action reflects upon you as upon him; if he makes erroneous diagnoses and unpardonable errors in treatment, as a member of the same profession it reflects upon you; if he is given to "back biting" and price cutting, the effect upon you is immediate and direct.

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If there is a veterinarian of an altogether different class, a good man, a fine fellow in your community, who by any chance is not a subscriber to VETERINARY MEDICINE, secure, and send us his subscription also. He will thank you for it many times.

As a Christmas present for some friend in the profession, what is more appropriate than a year's subscription to VETERINARY MEDICINE? In no other way can you do him as much real benefit for ten times the price.

We shall not be unappreciative of such efforts on your part. In recognition of which we will gladly extend your own subscription a full year and send one new yearly subscription on your order both for **$3.00.**

OUR ANNUAL INDEX

Following our custom of presenting in the December issue an index for the volume completed with that number, we give, in this issue a complete alphabetical list of the contributors who have written for VETERINARY MEDICINE during the year, and of all of the articles, case reports and other discussions which have been published since last January.

Much careful work has been done on this index to make it convenient for the subscribers who wish to refer to anything published during the year. Hundreds of cross references have been given. All diseases and operations discussed have been listed under their names as have also all remedies used, and in addition to this book reviews, bulletin reviews and formulæ have been grouped under these heads. In fact, the only thing not completely indexed by sub-

jects are the abstracts, which lack of space has compelled us to list in groups.

No text-book or other treatise on veterinary science discusses anything like the number of subjects of immediate and practical interest, that are to be found in a volume of VETERINARY MEDICINE, which is referred to by most subscribers oftener than all other sources of information on veterinary science combined. The index which we give in this issue will be an inestimable convenience for facilitating this reference, e. g. suppose one wants to find what has been written during the year on azoturia, a glance at the index shows that it has been discussed in articles beginning on pages 177, 227, 239, 286, and 547. Or suppose the subject for investigation be tetanus, it was discussed in nine articles, beginning on pages 254, 303, 384, 477, 541, 549, 601 and 665. Again, suppose a subscriber wishes to read all that had been said concerning arecoline during the year; alphabetically arranged under this head we find that it was discussed in three articles on pages 52, 474 and 670. In the list of bulletins, seventy-three of interest to veterinarians are given together with the contents of each and the station from which it may be secured. There is scarcely a remedy used in veterinary medicine, scarcely a disease veterinarians are called upon to treat, scarcely an operation that occurs in ordinary practice, upon which one to several, familiar with the subject, have not written during the year.

Of course, every subscriber should keep a file of VETERINARY MEDICINE. It is scarcely thinkable that anyone interested in any branch of veterinary science would forego the advantages to be obtained from having a file of this publication for reference. Files of publications can be kept best by binding them in permanent book form, but, where few volumes are to be bound at a time this is somewhat expensive and often inconvenient. Those who do not wish to go to this trouble and expense will find in our "Big Ben" binder a permanent file for VETERINARY MEDICINE that we believe will answer every purpose satisfactorily.

QUININE FOR CHOLERA

The known efficacy of quinine in the treatment of malaria in man, a protozoan disease, and the recently reported success with it in the treatment of rabies, probably another protozoan infection, has led at least one investigator to try it in the treatment of hog cholera, which is believed by not a few to be due to protozoa also.

In the treatment of hog cholera quinine bisulphate was used hypodermically in doses of seven and one-half to twenty grains, once a day, and apparently good results were obtained.

Mention of this is made not with the intention of introducing a treatment for hog cholera, but to suggest that others give the hypodermic use of quinine bisulphate a trial in this disease when opportunity offers to do so, and to report their results in VETERINARY MEDICINE.

BOOK REVIEWS

A Text-Book of Horseshoeing for Horseshoers and Veterinarians, by A. Lungwitz, former member of the Royal Saxon Veterinary Commission, late instructor in the theory and practice of horseshoeing, and director of the shoeing school of the Royal Veterinary College in Dresden, Germany, and John W. Adams, professor of surgery and obstetrics, and lecturer on shoeing in the Veterinary School, University of Pennsylvania.

The subject matter of this work deals in a comprehensive manner with the problems of horseshoeing and contains also a considerable amount of valuable information, treated but superficially, if at all, in other sources; particularly the elemental anatomy of the foot: the hoof—its form, parts, growth, qualities, physiological movements and wear; care of the hoofs of colts to prevent distortions of the bones of the pastern in later life; various standing positions on the limbs and the shapes of hoofs that correspond to these positions; the plane shoe—its parts, general characteristics; flight of hoofs—as dependent on the position and direction of the legs, and the

influence of the weight in the shoe in modifying the flight of the foot.

A knowledge of the principles of horseshoeing is indispensable to veterinarians. In all but cities of considerable size horseshoeing is done almost entirely by blacksmiths, whose woeful ignorance of all that pertains to the subject is appalling, and on their judgment in this matter veterinarians cannot rely. The importance of a familiarity with the wide field covered by this work cannot be overestimated in the treatment of lameness.

The scholarship, ability and reputation of the translator is sufficient guarantee of the merit of this work which will be found of great value to the veterinarian and undoubtedly will meet with a cordial reception at the hands of both students and practitioners.

The Eleventh Edition, 200 pages, 29 illustrations, cloth bound, published by J. B. Lippincott Company, Philadelphia. Price $2.00 net.

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A Compend on Bacteriology, including animal parasites, by Robert L. Pitfield, M. D. This little book is designed for students preparing for examination and for practitioners who desire to review the subject of bacteriology and acquaint themselves with the principal facts of this rapidly growing science.

The subject matter is made as concrete as possible and is reduced to the briefest space in which can be given the essential facts of the accepted teachings on the subject. Perhaps nowhere else can one obtain an equal amount of information on the subject of bacteriology for so small a price. The details of cultural methods and laboratory technic are not given. The chapter on immunity has been brought down to date and is particularly valuable. Second edition, 280 pages, well illustrated, cloth bound, published by P. Blakiston's Son and Company, Philadelphia. Price $1.00 net.

—

Biochemistery and Physiological Therapeutics, by Alexander Chittick, M. D. This is an unusual book. The author holds that disease is largely due to an excess of or lack of what he terms primary cell salts, and teaches that most pathogenic processes are to be corrected by the administration of these salts (certain salts of calcium, potassium, magnesium, sodium and iron, of which calcium is the chief). Lack of oxidation is considered a very important factor in increasing susceptibility to disease.

The work is written from the standpoint of the physician, but if the deductions of the author are correct this line of treatment should be adaptable, at least in considerable degree, to veterinary medicine, and should prove valuable in various conditions, particularly in azoturia, which, reasoning from analogy, should yield promptly to an intravenous injection of sodium citrate and calcium creosote, one ounce of each.

The author is very partial to intravenous medication, to the technic of which he devotes a whole chapter. Cloth bound, 98 pages, published by the Physicians Drug News, Newark, N. J. Price $3.00 net.

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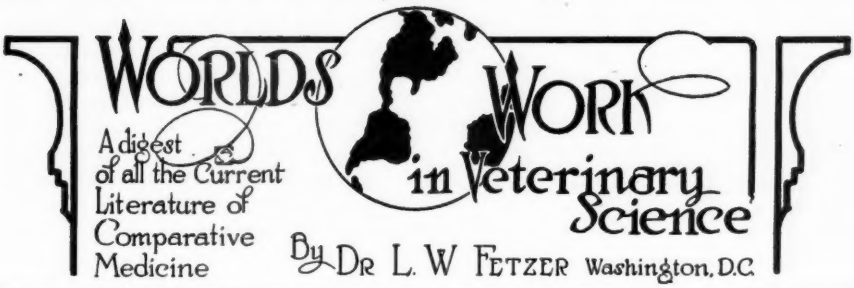
Gould's and Pyle's Pocket Cyclopedia of Medicine and Surgery, revised by R. J. E. Scott, M. A., B. C. L., M. D. This is another little volume of the style of Gould's Pocket Medical Dictionary. By using a condensed type and printing on very thin, though opaque, paper, it has been possible to condense in this volume an immense amount of information, and yet keep it within pocket size. It has been said of this volume that it contains just exactly what you want to know in just the place you can find it. It is based on human medicine, but of course contains a good deal that is equally applicable to veterinary medicine. The amount of tabulary matter is large. This in part has enabled a comprehensive scope to be treated in a small space. The system of cross references is so complete that repetition, a fault of most encyclopedias, is almost avoided.

The work should, and doubtless will, prove popular in its field. Bound in flexible leather, with gilt edges. 850 pages. Published by P. Blakiston's Son and Company, Philadelphia. Price $1.00 net.

(*Continued on page 679*)


WORLDS WORK
in Veterinary Science
A digest of all the Current Literature of Comparative Medicine
By Dr L. W Fetzer Washington, D.C.

VIRULENT anthrax bacilli in the saliva of a horse. J. G. Th. Arnta. Berl. Tierärtzl. Wochenschr. 1913, Vol. 29, No. 36, p. 640. —In the saliva from a horse affected with anthrax having a marked angina, virulent anthrax bacilli were detected. The importance of this source of infection is pointed out. The saliva of all horses showing an acute or a per acute angina should be examined for the presence of anthrax bacilli.

—

CHEMICAL and bacteriological studies of fresh and frozen New Zealand lamb and mutton. A. M. Wright. Jour. Soc. Chem. Industry. 1912. Vol. 31, No. 20, pp. 965-967.—This is a study of the changes which took place in meats which were shipped, to the European continent, in cold storage. The storage temperature varied between —16.5° C. and —10.5° C. and the time of observation was 160 days. It was found that the water content of the meat diminished 2.5-3.5% and the protiose, peptone and basic (that due to flesh bases) nitrogen increased and the coagulable nitrogen decreased in amount. No appreciable changes were noted in the ammoniacal nitrogen. The changes described are said to be due to enzyme action, and from point of time they seem to correspond to the socalled (nonbacterial) ripening stage of meat. For lamb it was present on the 60th day and in mutton between the 90th and 120th days. The bacterial flora on the storage meat did not differ in amount from that on the fresh meat.

Freezing the meat gradually and subsequently thawing it did not produce any rupture of the tissue nor were any other physical changes noted. The nutritive value of the meat remained unchanged.

—

THE resorption of bromides from the intestine [of dogs]. S. von Bogdandy. Zeitschr. f. Physiol. Chem. (Hoppe-Seyler), 1913, Vol. 84, No. 1, pp. 15-17.—Bromides a short time after ingestion are found in large amounts in the blood. The sodium chloride contained in the blood is partially displaced by the bromide. Both potassium and sodium bromides were used in the tests.

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POLYNEURITIS gallinarum caused by different foodstuffs with especial reference to the effect of commercial rice coating on neuritis production, C. Wellman and C. C. Bass. American Journal of Tropical Diseases and Preventive Medicine, 1913, Vol. 1, No. 2, pp. 129-139.—The purpose of this investigation was to determine what common articles of diet other than rice will give rise to polyneuritis in fowls when they are fed these foods as an exclusive diet. It was furthermore desirous of knowing whether glucose and talcum present on commercial polished rice is the cause of polyneuritis when the animals are fed on this kind of rice as an exclusive diet.

It was found that glucose and talcum when fed together or separately would not produce polyneuritis gallinarum in birds receiving a diet which does not of itself produce the disease.

Birds affected with the disease, as far as prompt recovery is concerned, are not affected by giving large doses of either substance. Consequently glucose and talcum play no part in the production of polyneuritis in chickens.

AUTOSEROTHERAPY in pleuritis. P.Haan, Revue générale de Med. Vet. 1913, Vol. 21 No. 251, pp. 621-625.—Autoserotherapy was successfully applied in cases of serofibrinous pleuritis. In these cases a considerable amount of the fluid is drawn from the thoracic cavity, and 40 Cc. (about one and one-third ounces) of the fluid is injected into the subcutaneous tissue of the same animal. Improvement is usually noticed the day following the injection and manifests itself by a restoration of the appetite. The treatment should be begun early because fully two-thirds of the horses can be saved by this process.

—

THE use of virulent salt solution as a virus in manufacturing hog cholera serum, W. S. Robbins Jour. Infect Diseases (1913), Vol. 12, No. 3, pp. 335-340.—The virulence of salt solution recovered from abdominal cavity of virus pigs varies greatly, with the amount of solution injected as well as, with the time the solution remains in the cavity. The percentage of injected solution recovered varies greatly with size and age of pig, as well as, with time it remains in the cavity. Salt solution injected into abdominal cavity of virus pigs in amounts not exceeding 30 Cc. per pound of body weight and allowed to remain not less than five hours is efficient in hyperimmunizing pigs. The use of salt solution as a virus greatly increases supply of virus and may prove a means of greatly reducing the cost of manufacturing serum.

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HYPERSENSITIVENESS to tuberculo-protein and to tuberculin, C. R. Austrian (Bul. Johns Hopkins Hosp. 1913, Vol. 24, No. 267, pp. 141-147; Jour. Amer. Med. Assoc., 60, 1913, No. 21, p. 1665).—The experiments confirm the work of others. It was shown that (1) a protein substance can be obtained by the extraction of tubercle bacilli with water, and with it animals can be actively sensitized; (2) that a refractory condition to this protein can be produced; and (3) that the hypersensitive condition is transmitted from mother to young.

It was further established that active sensitization induced by treatment with this protein may be as regular in its development and as intense in its manifestation as is that produced by treatment with other proteins. Passive homologus and heterologous hypersensitiveness can occasionally be produced with the blood or with the serum of an actively sensitized animal. The material transmission of the hypersensitiveness does not take place through the milk. The regularity with which maximum hypersensitiveness can be produced is largely dependent on the use of a sufficient amount of protein in preparing and in testing the animals. All the manifestations of typical hypersensitive to protein can be produced in guinea pigs by treatment with aqueous extracts of tubercle bacilli. Guinea pigs can be sensitized with albumose-free tuberculin and with old tuberculin that has been freed of glycerin and made poor in salts; and sensitization with any of these products causes the animal to react to injections of the others.

Hypersensitiveness to tuberculin develops within seven to fifteen days after infection with the *Bacillus tuberculosis*. Tuberculous animals can occasionally be intoxicated with tuberculo-protein, developing symptoms of hypersensitiveness. The passive transference of hypersensitiveness from a tuberculous man to normal guinea pigs has been successfully accomplished by the author and positive results have likewise been obtained when the serum of a sensitized animal has been injected into an untreated one. The type of the reaction symptoms and the development of them in an infected host after the administration of minimum doses of tuberculin are likewise suggestive facts.

The author is of the opinion that the evidence gathered justifies the interpretation of the tuberculin reaction as a manifestation of hypersensitiveness.

—

THE rate of reproduction of various constituents of the blood of an immunized horse after a large bleeding. R. A. Obrien. Journal of Comp. Pathology and Bacteriology, 1913, Vol. 18, No. 1, pp. 89-98.—The following changes in the blood of an immunized horse were noted after drawing ten liters of blood from the animal.

The number of white cells were found to

vary very much, but in the differential count only small variations were noted. The hemolytic titre was fairly constant and the variations were at most about ten percent from the initial figure. The total salt content did not decrease, but, on the contrary, it often increased to the extent of ten percent. All the remaining blood constituents showed a decrease. With hemoglobin and red corpuscles it was fifty to sixty percent of the original figure. Both of these fell parallel. The color index of the new red cells remained at the normal figure. The curve of the volume of the red blood cells did not correspond very closely to that of the number of red cells. The total protein curves and those of diphtheria antitoxin show a fairly close relationship.

—

CONTAGIOUS abortion in horses. Dassonville and Rìviière. Rev. generale de Med. Vet., 1913. Vol. 21, No. 245, No. 246, pp. 237-254 and 301-322.—Two epizootics were studied in which the aborted foals were found to be affected with a polyarthritis. A bacterium differing from Bangs bacillus (isolated from cows) or the organism isolated by Smith and Kilbourne (horses), and pathogenic for the usual laboratory animals was isolated from the foals. An injection of the filtrate from a buoillon culture of the bacterium produced abortion in rabbits.

—

CULTIVATION of the virus of hog cholera. W. Pfeiler and W. Lentz. Berlin, Tierarztl. Wochenschr. 1913, Vol. 29, No. 39, pp. 689-692.—This details cultural and inoculation experiments with shoats the result which shows that the filtered virus of hog cholera is cultivatable. If verified by other investigators along this line, it must be considered an important finding.

—

ACTION of Arseno-aromatic compounds (606 and neosalvarsan) on the hemoglobin of the blood. R. Dalimier (Comp. rend. 1913, 156, p. 629-631). Salvarsan has no action on hemoglobin either in the test tube (vitro) or in the body (vivo). On the other hand neosalvarsan is markedly hemolytic and produces a reduction of oxyhemoglobin in vitro. On injecting neosalvarsan in an ear vein of a rabbit only a fugitive hemolysis is noted, but no reduction of hemoglobin.

—

EXPERIMENTAL studies in regard to the therapeutic value of yeast upon the alimentary, multiple polyneuritis in guinea pigs and pigeons. M. Barsickow, Biochemische Zeitschr., 1913, Vol. 48, No. 5, pp. 418-425, one plate.—This work is a contribution from the experimental-biological division of the Royal Pathological Institute of the University of Berlin.

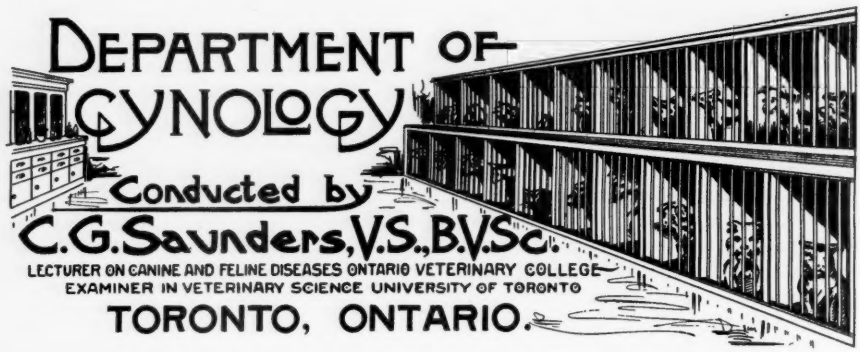
In the experiment four types of yeast preparation were tried. As a representative of type one, fresh yeast was carefully dried by exposure to the air with the chief object of having present seventy to eighty percent of living yeast cells. For the second group type acetone—permanent yeast (containing no living yeast cells) was used. This is made by treating yeast with fifteen times its volume of acetone, which has the double function of promoting drying and at the same time killing the yeast. The enzymes remain intact in this preparation however.

Cerolin was selected as the third type and consists of the fatty constituent (extracted with alcohol) of the yeast cell. The fourth type yeast preparation was made by drying the yeast cells at 120° C. This preparation contains neither enzyms nor living yeast cells.

Taking the results as a whole, it is shown that yeast heated at 120° C., i. e., preparation No. 4 has the same prophylactic properties as the preparation containing living yeast cells and enzyms. Nuclein, or its salts, is probably the principle which gives yeast its therapeutic efficiency.

—

TUBERCULOSIS in goats. Dr. Schlegel. Zeitschr. f. Tiermedizin, 1913, p. 34.—A description of the pathologic findings in two cases. One was an open case (pulmonary with involvment of mediastinal and bronchial glands) and the other a generalized case having extensive involvement of the lungs, kidneys and liver.



Diseases of the Rectum and Anus

THIS class of ailments includes: Hemorrhoids, prolapsus recti, prolapsus ani, fistula in ani, atresia ani, obstruction of the anal glands.

Hemorrhoids

A dilated and varicose condition of the veins around and just within the anus. This troublesome condition is frequently seen in old over-fed and fat dogs.

Cause.—Constipation, over-feeding, debility, impaired portal circulation, old age and want of exercise are the major causes of hemorrhoids in dogs.

Symptoms.—Pain and irritation during defecation, pruritus, the animal continually licking the parts and rubbing them on the ground. The anal surface appears moist and swollen and the feces are frequently streaked with blood. Constipation is often present both as a symptom as well as a cause, the patient owing to the pain experienced delaying defecation as long as possible.

Treatment.—This consists in attention to the state of the bowels, mild laxatives such as cascara, phenolphthalein, olive oil, etc. being given to effect, and local treatment to the affected parts. The anal region should be kept clean and dressed with anodynes and astringents, such as adrenalin ointment, hazeline ointment, bensinol ointment or the Unguentum Gallae et Opii (B. P.). In internal piles suppositories of any of the above may be used so as to bring the medicaments into direct contact with the dilated veins. In cases where the above treatment is ineffectual a resort must be had to surgical interference. The piles may be removed either by ligation or by clamps and the actual cautery. By the former method, the piles are picked up separately with forceps and ligated by passing a curved needle armed with the ligature around them, after first cutting a groove around the base of each with blunt pointed scissors. Where the clamp is used the pile is picked up as before, the clamp applied and the loop removed with the cautery. In operating by either method a general anesthetic is advisable.

After-Treatment.—After the operation the patient should be kept without food for twenty-four hours and for the next week allowed only small quantities of milk, beef tea, or other sloppy diet. Small doses of opium should be given three times a day to keep the bowels at rest, but if no movement of the bowels has taken place by the fourth day a warm enema of oil should be given. Locally the parts must be kept clean and dressed with antiseptics, such as chinosol ointment, or suppositories.

Prolapsus Recti

This condition generally occurs suddenly during the course of or after recovery from some debilitating illness.

Cause.—Debility, constipation, diarrhea, hemorrhoids, rectal irritation and the consequent straining, are all important causes of prolapsus recti.

Symptoms.—The patient shows a disposition to hide and is quieter than usual. The floor on which it has lain down is blood-stained, as are also the hindquarters. Examination, which is resented, reveals the prolapsed gut, congested, and it may be lacerated. In a few hours if not treated the gut becomes intensely swollen, of a dusky hue, and exceedingly painful, and if further neglected death may take place from shock, collapse or septic absorption. When the act of defecation takes place the gut is seen to protrude and retract as straining takes place and ceases.

Treatment.—As a general rule, a general anesthetic should be given since the parts are very sensitive and there is always straining by the patient; furthermore, reposition is a great deal easier when the parts are relaxed and the patient's opposition under control. In recent cases before the mucous membrane of the gut has become friable and easily lacerated, the parts should be bathed freely with hot water, to which may be added some antiseptic such as creolin or chinosol, or if exceedingly congested, may be sprayed with a solution of adrenalin chloride, 1 to 10,000 or 1 to 20,000. The gut is then cautiously manipulated with the fingers and the prolapsed portion replaced; the rectum being smoothed out into its normal position with the middle finger. A stitch or two should then be placed across the anus to retain the bowel or a purse string suture inserted for the same object.

In longer standing cases in which the prolapsed portion is lacerated and the mucous membrane is friable, cold water should be substituted for hot water in the preliminary bathing as it will tone up the parts and render them less liable to injury during the subsequent manipulations. Straining must be controlled by morphine or cannabis indica, and the diet restricted to slops. Constipation should be guarded against by the use of laxatives of olive oil or cascara. Prolapse of the rectum is very prone to recurrence and amputation is quite likely to be necessary to obtain permanent relief. Amputation should be proceeded with in the first instance if the parts are badly torn or show symptoms of gangrene.

Amputation of the Prolapsed Rectum

Instruments Necessary.—Scalpel, scissors, tissue forceps, eight needles and sutures, needle holder and antiseptic solution (chinosol 1-1000) and artery forceps. The instruments, needles, sutures, etc., and the operator's hands having been made surgically clean and the patient under a general anesthetic, H-M-C and chloroform by preference, gentle tension is made of the prolapsed gut and a needle armed with a suture (cat gut or absorbent silk), is thrust through the gut from above downwards as close as possible to the anus; another suture is placed transversely so as to cross the first one at right angles. The assistant then holds the ends of the sutures while the operator amputates the gut close behind the sutures. Any hemorrhage is then controlled with the artery forceps and the sutures cut at the point of intersection and tied. In this way it is seen that remaining portion of the rectum is secured with four sutures. Sutures an eighth of an inch apart are then put in all round the gut, the ends cut short and the parts gently pushed back inside the sphincter ani after being washed in the antiseptic solution.

After Treatment.—All food must be withheld for twenty-four hours and the diet restricted to slops for at least four days, the bowels up to that time should be kept quiet with small doses of opium. After the fourth day, if the patient is uncomfortable, a laxative may be given to produce action of the bowels and for a month at least the feces must be kept soft by the administration of laxatives (olive oil) and soft foods.

Prolapsus Ani

The causes of this condition are the same as those producing prolapsus recti, and while of not such a serious nature as that condition, yet is often exceedingly troublesome to deal with and causes the animal much discomfort, to say nothing of the unsightly appearance it presents. The symptoms are practically the same as in prolapsed rectum except that only a very

small portion of the posterior part of the rectum appears as rather a red angry looking mass at the anal opening.

Treatment.—Reposition is comparatively easy, but to induce the parts to remain in their natural position is often quite another matter. Astringent washes may be tried and the anus sutured; the same rules as to diet and regulation of the bowels being applied as in prolapsus recti.

If these measures fail to give permanent relief, operation should be resorted to. The animal should be placed on a milk or beef tea diet for a few days previous to operation and should receive a laxative to clean out the bowels. Immediately before operation the patient should receive an enema, of warm boracic-acid solution, and a general anesthetic administered. The relaxed portion of the mucous membrane is then gently pulled out from the anus by the fingers and three of four eliptical wounds, from one-half to one inch in length, made in the longitudinal axis of the mucous membrane close to the anus, with sharp scissors. The rationale for this operation lies in the fact that contraction takes place during cicatrization and thus tends to prevent the parts from again prolapsing.

The after treatment consists in giving antiseptic injections or suppositories, keeping the bowels at rest with opium and prescribing a sloppy diet for a week or two. The animal should then be placed on a substantial, nutritious diet and every effort made to improve the general condition by proper exercise and a good course of tonic medicine.

Fistula in Ano

A fistulous opening in the anal region.

Causes.—Laceration of the rectum by foreign bodies such as needles, fish bones, spicules of bone, etc., with subsequent abscess formation, neglected hemorrhoids, and constipation are common causes of this ailment.

Symptoms.—The patient is continually licking the anal region and demonstrating the irritation that exists there by rubbing it along the ground. Upon examination a fistula, discharging pus, is seen near the anus.

Treatment.—The extent and depth of the sinus must be accurately determined by aid of a probe gently and cautiously introduced. By aid of a grooved director and bistoury the sinus should then be laid open, cutting through all tissues, even the sphincter ani if necessary in order to provide thorough drainage. The abscesses must be evacuated, the fistulous walls curretted and the wound tamponaded with iodized gauze, which should be removed in twenty-four hours. The wound is then irrigated with antiseptic lotions until healed.

A new line of treatment for fistulae and similar conditions has lately come into vogue with remarkably good results. The fistulous tracts are first syringed out with hydrogen peroxide and as much pus as possible removed; a mixture of bismuth subnitrate and paraffin is then injected, so as to completely fill the whole tract and the opening plugged to prevent the escape of the mixture.

The formula for this bismuth-paraffin paste is as follows:

Bismuth subnitrate	120 grams
White wax	20 grams
Paraffin	20 grams
White vaseline	240 grams

The mixture is heated to liquefaction before using and is injected with a metal syringe that has been previously warmed. The treatment may be repeated every five days as long as necessary.

Atresia Ani

Imperforate anus is a congenital defect and often escapes notice for some hours after the puppies are born. Upon examination the anal opening is found to be absent, but the position of the anus may be found by a bulging of the perineum from the imprisoned feces. In some cases the opening is merely occluded by the skin and all that is required is the excision of an elliptical portion of the integument to rectify the condition. In others, however, the rectum ends as a blind tube and is not attached to the anus proper. When such is the case, after removing an elliptical portion of the skin the end of the rectum must be sought for, brought back into the wound, opened and stitched to the raw margin of the

wound. Occasionally the rectum is entirely absent and of course treatment is then hopeless.

The after treatment consists in the application of antiseptics and keeping the parts clean.

Obstruction of the Anal Glands

Situated on either side of the anus, the ducts communicating with the rectum just anterior to the *sphincter ani*, are two pouches whose walls secrete a mucoid substance, the function of which is to lubricate the parts during the act of defecation. If by reason of any rectal irritation the ducts of these glands become blocked the secretion eventually causes them to become enlarged and encroach on the lumen of the rectum, causing difficulty and pain during the act of defecation.

Symptoms.—A swelling about the size of a walnut on either side of the anus; constipation, often the result of the pain, which defecating causes, and irritation shown by the animal's licking the anal region and rubbing it along the floor are indications of this ailment.

Treatment.—In many cases the evacuation of the contents of the glands by pressure exerted by the finger introduced into the rectum and the correction of constipation and any dietary errors is sufficient to bring relief, but if the condition keeps on returning, more radical measures must be adopted. The glands should be opened freely from the exterior, the contents cleaned out and the walls freely curetted and then painted with tincture of iodine to destroy their secreting properties. The wounds are then treated antiseptically until healed. The operation is quite safe and if care is taken to entirely destroy the secreting walls a permanent cure may be confidently expected.

Diseases of the Liver

Icterus or Jaundice

ICTERUS cannot properly be called a disease per se, but is really only a symptom of some other disease affecting the liver or its ducts. Since diverse causes may produce icterus, it is necessary for purposes of clinical description to classify the various forms of icterus according to their etiological factors.

1. **Catarrhal Jaundice** occurs usually in connection with gastroduodenal catarrh, the catarrhal condition extending up the *ductus choledochos*, the duct becoming blocked by the subsequent swelling and formation of mucus. The bile is thus prevented from reaching the bowel and dams back to the liver where it is reabsorbed into the circulation.

Symptoms.—In addition to the symptoms appearing in the course of an attack of gastroduodenal catarrh, the visible mucous membranes are found to be stained a characteristic yellow color. Later on bile may be found in the saliva, urine and milk of nursing bitches. Lastly the skin becomes deeply stained and if the stenosis of the duct is complete, cholemia supervenes with a fatal termination. Its advent is recognized by great weakness, fall of temperature, slow, weak pulse and increase of icteric symptoms. The patient dies in coma. In addition to the foregoing signs, the absence of the bile in the intestinal tract seriously interferes with the digestive processes, peristalsis is diminished and the feces become clay-colored and very offensive. Constipation is usual. Catarrhal jaundice is the most important jaundice of the dog and the prognosis is usually grave.

2. **Heptogenous Icterus.**—This form of icterus is seen as a symptom in hepatitis, atrophy of the liver, degenerations of the liver, neoplasms and thrombosis of the portal vein.

3. **Hematogenous Icterus.**—Jaundice occurring in the course of septic or infective diseases. It is due to decomposition of the blood.

4. **Malignant Malarial Jaundice.**—A symptom of canine malaria (caused by the Piroplasma canis).

Treatment.—

1. CATARRHAL JAUNDICE.—One of the most essential factors in the treatment of this condition is the proper regulation of the diet. Lightly cooked, or raw meat, finely minced and mixed with small quantities of boiled rice or oatmeal form the best ration. Constipation should be overcome by moderate doses of calomel followed in a few hours by a saline laxative such as epsom salt or artificial Carlsbad salt.

The abdomen over the region of the liver should be gently massaged, the gentle pressure helps to mechanically empty the gall bladder. Boldine, the active principle of Peumus boldus, gr. 1-30, bilein gr. 1-8 combined with hyoscyamine gr. 1-250 should be given three times daily. In cases with great depression and threatening coma recourse must be made to stimulants such as strychnine, caffeine, camphor, etc.

HEPTOGENOUS ICTERUS.—In the heptogenous form the icteric symptoms are best treated with small repeated doses of calomel, followed by nitro-muriatic acid. Other treatment must be directed against the primary condition.

HEMATOGENOUS ICTERUS. — This form must be treated by vigorous eliminative measures combined with proper treatment of the condition responsible for it.

Hepatitis. Inflammation of the Liver

Hepatitis occurs in two forms. Acute parenchymatous and chronic interstitial.

Etiology.—Acute parenchymatous hepatitis, inflammation of the liver substance, occurs during the course of the various infectious diseases. Injudicious feeding, on rich, stimulating food, exposure to cold, and phosphorous poisoning are also causes of hepatitis.

Symptoms. — Vomiting, colicky pains, pain on pressure over the hepatic area, icterus and fever.

Treatment.—Small doses of calomel followed by saline laxatives, hot applications to the abdomen and hypodermic injections of morphine as required to relieve pain. The diet should consist of sloppy food during the attack and previous errors corrected thereafter.

Cirrhosis of the Liver. Interstitial Hepatitis

The most marked result of chronic interstitial hepatitis is the formation of new connective tissue in the liver. The character, amount and distribution of the new tissue varies greatly in different cases. Secondarily there are usually marked changes in the liver cells and blood vessels and gall ducts. The new tissue is most commonly formed and most abundant in the periphery of the lobules along the so-called capsule of Glisson, but it may extend into the lobules between the liver cells. The new formed tissue tends to contract, causing atrophy of the cells from pressure or from interference with the portal circulation. The bile ducts may also become obliterated and both the secretion and the outpouring of the bile be interfered with. Secondary lesions occur owing to the above-mentioned changes and are ascites or dropsy icterus, gastrointestinal catarrh and hemorrhages.

Etiology.—The causes of cirrhosis in the dog are unknown, but it is often seen in connection with cardiac diseases.

Symptoms.—Gastrointestinal catarrh with icterus, abdominal dropsy, cardiac disturbances and gradual emaciation.

Treatment.—Cirrhosis of the liver invariably sooner or later ends in death, and treatment is ineffectual. However, life may be prolonged, by treating the symptoms as they arise, and by liberal diet, alteratives and tonics keeping up the patient's strength.

The Veterinarian in the National Guard

(*Continued from page 652*)

regular army; then the obtainment of commissions for veterinarians in the state militia will be easy. Conversely, this can never be accomplished unless we as a profession unitedly demand that this reform be made an actuality and see that this is done. The militia regiments are regiments of citizen-soldiers. It is for the veterinarians having influence amongst these citizen-officers and men in the militia to induce them to indorse our bill and to help push it along in Congress, where the militia is a power politically.

Pointed Opinions by Readers on Live Topics of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the thanks of the editor, the approval of the veterinary profession and the lasting gratitude of those who are aided by your suggestions.

The Treatment of Tetanus

AS THIS is a subject which has been thoroughly discussed both in our veterinary medical journals and veterinary societies, a lengthy discourse on the inoculation symptoms, etc., would be needless. It is therefore my object in presenting this paper to point out a few cases coming under my observation, and to give the treatment and the results obtained.

The question sometimes occurs to me, upon reading an article of a miraculous recovery from this malady under a certain line of treatment, would not this patient have recovered under a different treatment or possibly without any treatment at all?

So long as we continue to report only the cases that recover, we cannot expect to arrive at an exact knowledge of the percentage mortality or to know what treatment or remedies are ineffectual?

The subject of this paper being the treatment of tetanus, the etiology will be omitted purposely, as the causative factors and influences are familiar to all.

In the treatment of tetanus we have always to bear in mind the neutralization of the powerful toxin generated by the bacillus of tetanus.

This toxin is disseminated by the blood, lymph and nerve channels, to all parts of the body; thus producing septic intoxication of the entire system while the germ remains at the seat of infection and continues the elaboration of toxin.

In outlining the treatment for tetanus we have to consider: First, local treatment; second, neutralization of uncombined toxin; third, the treatment of the symptoms presented. Under local treatment we have to employ thorough antisepsis and cauterization.

In the neutralization of the uncombined toxin we must use agents that have the power of uniting with the free toxin, thereby lessening its virulency. The best known agent having this power is antitetanic serum. The efficiency of this product as a curative agent is questioned by some, but it is well known that it has the power to unite with the uncombined or free tetanus toxin.

In the treatment of the symptoms we have mainly to deal with convulsions and hyperexcitability. Environment and natural surroundings have much to do with the controlling of these two conditions and as second aid in combating these two aforesaid conditions we are forced to use some one of the different antispasmodics, among which may be mentioned chloral hydrate, morphine, indian hemp, lobelia, the bromides and phenol.

This last named agent has been used extensively by the profession with varying degrees of success. It has been administered orally, intravenously, subcutaneously, and in clyster in solutions of different strength.

I will cite a few cases coming under my care, giving the treatment employed and results of each case.

Case I.—Black gelding, aged seven years, weight about 1500 pounds. Point of infection a penetrating nail-wound. Ill four days before treatment was commenced. Presented the usual symptoms.

Treatment.—The nail wound was pared out, the cavity soaked with carbolic acid and tamponed with pledgets of cotton soaked in tincture of iodine. A ten-percent solution of phenol in glycerine and alcohol was given hypodermically in doses of three ounces morning and evening. Nine thousand units of antitetanic serum were given daily for seven days. The phenol was continued until symptoms of poisoning were evident. Result: Complete recovery in three weeks.

Case 2. Bay gelding, aged twelve years weight about 1,200 pounds. I was called to attend the case by the owner upon notice of first symptoms. The animal had worked the day previous and nothing unusual in his manner of locomotion, mastication or deglutition was noticed. The animal was a victim of the last stages of the disease, having developed the same over night. The point of infection was the broken skin in folds of the fetlock.

Treatment.—Locally tincture of iodine was applied. Phenol in fifteen percent solution in glycerine and alcohol was given intravenously morning and evening in doses of two ounces. Six thousand units of serum were employed daily. Result: died on third day.

Case 3.—Black gelding, aged five years, weight about 1,200 pounds. He had been ill ten days before treatment was commenced. Point of infection a penetrating nail.

Treatment.—At point of entrance of nail a profuse suppuration was present, plantar surface of foot was pared and necrotic foci exposed. Mercuric chloride packs in strength of 1 to 500 were applied. Phenol, five percent solution, in glycerine and water, in doses of ten ounces, was given intravenously for a period of nine days. Serum was not given in this case. Result: complete recovery in three weeks.

Case 4.—Grey gelding, aged eight years, weight about 1,500 pounds. My attention was called to the case upon notice of first symptoms by owner. The animal had worked and eaten well the day previous. Upon examination the patient was found to be in the last stages of the malady. Explanation to the owner that the disease would undoubtedly terminate fatally did not suffice, so treatment was begun at once. Point of infection, a penetrating nail.

Treatment.—Locally none was given as nail puncture had closed. Phenol twenty-five percent solution was given in doses of three ounces, three times daily. Twelve thousand units of antitetanic serum was given intravenously daily.

Results.—On the fourth day while administering the phenol the shock was so great that he lost his equilibrium and went down, whereupon he was destroyed.

Case 5.—Bay mare, aged eleven years, weight about 1,200 pounds. Ill two days before treatment was begun. Point of infection, a collar gall.

Treatment.—Locally the gall was painted with tincture of iodine. Phenol, ten percent solution, in doses of three ounces was given hypodermically three times daily. Fluid extract of lobelia, one ounce fluid extract of stromonium, one ounce were given three times daily in drinking water.

Result.—Died on the seventh day after treatment was commenced.

Case 6.—Bay gelding, aged seven years, weight 1,400 pounds. Ill three days before treatment was commenced. Point of infection unknown.

Treatment.—Phenol, five percent solution in glycerine and alcohol, in four-ounce doses, was given hypodermically three times daily for ten days.

Result.—Recovered in three weeks.

Case 7.—Black gelding, aged ten years, weight 1,000 pounds. Sick two weeks before treatment was commenced. Point of infection calk wound above coronet.

Treatment.—The calk wound was treated with tincture of iodine. Phenol, one percent solution, in doses of five ounces, was given intravenously three times daily for a period of twelve days.

Result.—The animal recovered in three weeks.

Case 8.—Mule, aged twelve years, weight 900 pounds. Sick two weeks before my attention was called to the case. The animal was very much emaciated and owner was advised that the results of treatment would be doubtful, whereupon owner decided not to have animal treated. Point of infection unknown.

Result.—Recovered in three weeks.

R. M. QUIGLEY, V. M. D.

Tyrone, Pa.

THE USE OF PITUITARY EXTRACT IN BOVINE AND EQUINE OBSTETRICS*

The power of stimulating uterine contraction in the human being and in the small domestic animals which is possessed by extracts of the infundibular portion of the pituitary gland, is now well known. Hans Schmidt and Michael Kopp, two veterinary surgeons of Wolfratshausen, have been trying the agent this year, as occasion offered, in bovine and equine obstetric practice. They have used a 15 percent infundibular extract, which is supplied by the "Chemischen Fabrik" of Aubing, in 10 Cc. ampullæ, and with this they have treated six cases. Four were treated by the two men conjointly, and two by Kopp alone, and all are now reported at considerable length. The following is a very brief *resumè* of each.

The first case was a cow at her third parturition. A living calf was born, and the after-birth was discharged naturally after a few days. Nine days after calving the authors found her suffering from purulent metritis. The uterus was greatly enlarged and contained great quantities of pus, a portion of which was removed by massage of the organ through the rectum. The uterine walls were completely flaccid, and did not contract. It was syringed out with hot solutions, which had to be drawn away with the uterine catheter. The next day no uterine contraction had taken place, and 10 Cc. of pituitary extract was injected. This was followed after five minutes by powerful expulsive efforts, which lasted for about ten minutes and were accompanied by a copious discharge of pus. Rectal exploration then showed the uterus to be well contracted and sharply defined. The case did well.

The second case was a heifer, two and one-half years old, a primipara. For two days she had shown violent labor pains without delivery. Kopp, examining her on the third day, found that the pains had quite ceased. He diagnosed a complete torsion of the uterus, and after rectifying this by rolling the heifer, he ascertained by vaginal and rectal exploration that the *os uteri* was closed, and that the calf was dead. The injection of 10 Cc. of pituitary extract was followed in a few minutes by the onset of violent labor pains, which were maintained throughout the parturition. The *os uteri* opened naturally, the calf was extracted with manual assistance, and the case did well.

The third case was a cow, the number of whose parturitions was unknown. For a space of five days she showed frequent straining, with appearances resembling labor pains. Kopp examined her three days after the expiration of this period. He found the *os uteri* partially open, permitting the passage of a finger. The calf was dead, and there was a foul-smelling discharge in the vagina. The temperature was 104.3° F., and no labor pains or straining were present. A first injection of 10 Cc. of pituitary extract had no effect, and the same dose was therefore repeated fifteen minutes later. This was followed by slight appearances of labor pains, and the dilatation of the *os uteri* until it permitted the passage of the hand. It was then possible to extract the fetus and disinfect the uterus, and after this had been accomplished the case did well.

The fourth case was a mare ten years old, at her second parturition. This animal had shown labor pains since the day before, and appeared completely exhausted when examined. The vagina was narrow, and the *os uteri* was only partially open, closely surrounding one foot of the foal. One injection of 10 Cc. of pituitary extract had no effect beyond inducing some attempts

*From *Münchener Tier. Woch.*

at straining, so the dose was repeated ten minutes later. This was followed by the onset of powerful labor pains, and by the dilatation of the *os uteri* in about ten minutes. After ten minutes more the foal was born without special assistance, and the case did well.

The fifth case was a newly-purchased heifer, two and one-half years old, a primipara. This case was seriously complicated by fatigue arising from transport, and by cardiac weakness. Violent labor pains had appeared early in the day and had ceased towards the afternoon, and the animal, when examined by the authors in the evening, was unable to stand. The *os uteri* was closed. In this case three injections, each of 10 Cc. of pituitary extract, were given at intervals of half an hour, the authors thinking it advisable to push the drug on account of the exhausted condition of the heifer.

The first dose was quickly followed by a return of labor pains, and the second by opening of the *os uteri* and protrusion of the membranes. The third caused violent pains (throughout which the heifer was still unable to rise), and the birth of a living calf ensued without assistance. No untoward results followed the three injections.

The sixth case was also a heifer two and one-half years old, and a primipara. In some respects this case greatly resembled the last one, as it was complicated by extreme exhaustion from transport. There was, however, no special cardiac weakness; but there was the additional complication of a torsion of the uterus. When this was recognized, the animal was unable to stand; and, after it had been rectified by rolling, even the application of an electric current failed to induce her to rise. The *os uteri* was closed. In this case, also, three injections of pituitary extract were given, causing the speedy appearance and gradual increase of labor pains. The *os uteri* opened and dilated by degrees; and, despite the exhausted condition of the heifer, a living calf was extracted.

In all these serious cases, the pituitary extract quickly induced vigorous contraction of the uterus; and in no case was this accompanied by tetany or any other undesirable effect. The authors therefore regard the agent as a valuable addition to veterinary therapeutics. Trans. for *The Veterinary Record.*

INTRAPERITONEAL INJECTION OF NORMAL SALT SOLUTION IN A HORSE

On July 21, I was called to see a case of a horse that had received a cut on the internal surface of the fore arm, about three inches above the knee, severing the posterior radial artery. There was a very profuse hemorrhage, and the horse lost a large quantity of blood before it was checked. This was done by packing the wound tightly with non-absorbant cotton, and then bandaging. This dressing was left in place for four days, after which it was removed, leaving a clean, granulating wound.

Seven days after the accident we were called because of the peculiar actions of the horse. He showed great immobility, did not appear to be aware of his surroundings, having a vacant stare, and appeared in all the world like a pronounced case of chronic hydrocephalus. The pulse was frequent, tense, and small; visible mucous membranes pale and bloodless. The affected leg, below the knee was swollen, cold, and there was an exudation from the skin of a thin, watery fluid, showing that a collateral circulation had not yet established itself. A diagnosis of general anemia, with a markedly anemic brain was made. The owner was informed that we would return later in the day and give an injection of normal salt solution.

When we returned with the salt solution, we found that the horse was down, and unable to rise. He was unconscious of our actions; pulse at the external maxillary artery absent, jugular vein relaxed and an inch in diameter; mucous membranes white and bloodless, breathing labored, nostrils dilated, muscular tremors, in fact all the symptoms commonly seen at the point of death.

The owner was informed that the horse would probably die in a very short time, but having the salt solution already prepared, we thought we might as well use

it, so by means of a fountain syringe and a hypodermic needle we began the injection into the jugular vein. This was hard to do as the horse kept struggling and beating his head on the ground, dislodging the needle. After about a quart had been introduced by this method, we were pretty well tired of it, so I suggested that we put the remainder of the fluid into the peritoneal cavity, allowing the enormous absorbing power of the omentum to introduce the fluid into the circulation. I inserted a trocar into the right flank, which was uppermost, so that the end was in the peritoneal cavity, and then attached the syringe to the canula. About three quarts of the salt solution was then rapidly introduced.

In a short time after this, the pulse became discernible, the tremors stopped, the tonus of the veins returned, and the horse climbed to his feet. A bucket of water was offered him and he took a few swallows. We left a heart stimulant and told the owner to let us know how he was in the morning.

Upon our arrival the next morning we found an entirely different looking animal from what he was the day before. He had drank a bucket of water, had eaten some feed, the pulse was good, and no reason could be seen why he could not recover entirely if the circulation in the leg should be re-established. He was put on a strengthening diet, stimulating treatment and iron prescribed, and he made an uneventful recovery.

I am reporting this case because nowhere in veterinary literature can I find a case in a horse, where the intraperitoneal injection of normal salt solution was used. The marked susceptibility of the horse to peritonitis would seem to preclude this method, but in this case we obtained absolutely no bad results, and I am certain that this alone saved the animal's life.

Another unusual feature was the anemia developing so long (seven days) after the hemorrhage took place.

A. C. WIGHT, D. V. M.

Pittsburgh, Pa.

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[The above report is a very important one. Veterinarians are apt to overlook the fact that in a case where there is a great loss of blood an intraperotoneal injection of salt solution is absorbed into the circulation almost as quickly as if it were given in the jugular vein, and a large quantity, two or more gallons, can thus be used.

The doctor is wrong, however, in the supposition that the intraperitoneal injection of normal salt solution has not previously been reported in veterinary literature. This matter was discussed rather fully in VETERINARY MEDICINE about five years ago and at that time a report was given of quite a large number of cases of azoturia which were treated with the intraperitoneal injection of three to eight gallons of normal salt solution. This injection was said to have improved the circulation and to have produced an immediate and marked diuresis which was believed to have materially aided recovery.—ED.]

FRACTURES IN FOALS*

Case I.—On March 24, 1910, I was called to see a valuable Shire filly foal by "Redlynch Forest King," three days old, suffering from a fractured humerus in the near fore leg, probably as a sequel to being stamped upon by the mare. Not being able to afix splints and bandages so high up in the leg, I simply applied a pitch plaster from the top of the scapula to the radius. All the straw in the box was replaced by chaff and the foal left there to take its chance. In about three or four weeks the foal began to use the broken limb, and eventually made a very good recovery—in fact the broken leg is now the better of the two, because unfortunately as a result of having to support all the weight for five or six weeks, the off fore leg became very pigeon-toed, and is so to this day. The filly, however, is able to work all right, and is likely to make a valuable brood mare.

Case II—A yearling filly, suffering from a fractured radius of the near fore, the sequel to a kick. I tried to set this case by means of splints and adhesive plaster bandages, but when the swelling in leg began to subside two or three days after,

*Reprinted from *The Veterinary News*

the bandages got loosened and slipped off. I then decided to apply a pitch plaster, as in the previous case, and the filly made an uneventful recovery, and was sold six months later for $100 at a public auction.

WILFRED WALTERS, M. R. C. V. S.
Blofield, Eng.

SUDDEN DEATH FROM BARIUM CHLORIDE

As I have had the sad experience that many others have had in the use of barium chloride intravenously, I will state my experience and hope some reader of VETERINARY MEDICINE will reply to my letter. I had used barium chloride on about twenty-five cases, previous to this date, with good results, and thought it the best drastic purgative to be obtained. I usually used from seven and one-half to ten grains, followed by a milder cathartic.

But the particular case I refer to was in a farm mare, seven years old. The history of the case as obtained over a telephone was as follows: The mare was sick. She had got to crib of corn thirty-six hours before I was called and ate all the corn she wanted. When I arrived she would not eat or drink. I made an examination and found pulse about sixty per minute, strong and full; respiration, thirty; temperature, 102° F. The owner said he did not think the mare had made any passages since eating the corn. She looked rather full but did not seem to be bloated, and the owner said she was not in foal. She was quite stiff when moved. I made a rectal examination but found no impaction, so I concluded to use ten grains of barium chloride, intravenously, and as I prepared it I remarked to the owner, "I will open her up or blow her up," and to my surprise I blowed her up, sure enough—she fell dead before I could clean my syringe, in less than two minutes. I would like to know the cause of the death and how to prevent another such accident when using barium chloride. I am sure the air was expelled from the syringe before it was attached to needle, furthermore, I have tried injecting air with no bad results.

I would still like to use the barium chloride if I could only know when it is safe to do so and when it is not safe, so I would be pleased to read letters published in the journal on the use of barium chloride, intravenously, as a purgative and how to overcome its dangers in such cases and how to guard against such.

I wish to call your attention to the fact that the occurrence of death after the injection was too prompt to have resulted from a rupture produced by the barium chloride.

C. E. WILLIAMS, D. V. M.
Russell, Iowa.

ARECOLINE CONTRAINDICATED IN TYMPANY

In the September number of the AMERICAN JOURNAL OF VETERINARY MEDICINE, page 479, I notice an article entitled "Possibly Intestinal Twist or Intussusception," which I think was neither, in fact was nothing more than gastric tympany.

The course of treatment followed in this case in my opinion was entirely contraindicated. The condition is an excess of free acid in the stomach which works chemically on the alkalis of the ingesta and generates the gas. This was aggravated by giving sodium bicarbonate further increased by the injection of arecoline.

To my idea a man could fill a balloon sufficient for flight if this treatment was continued a little while.

Taking the doctor at his word, when he administers arecoline, one of the objects is to increase secretions. Our trouble is already too much free acid in the stomach, then why not give treatment to allay or decrease the said acid secretions. To give arecoline in gastric tympany is always followed by increased pain, and increased tympany, which is always followed by a locked condition of the secretions, a fact which can be determined very easily by examining the mouth.

I think arecoline is contraindicated in gastric tympany to my entire satisfaction and yours if you try it in the next case you treat. Use the antiferments until the tympany is gone, or about gone, then give arecoline and watch the results. It will

cause distension with gas again, the result of the stimulated acid secretions of the stomach.

In flatulent colic pure and simple of the large intestine, where the distension is alarming, use the trocar without fear. I haven't a word of favor for arecoline in any of the tympanitic forms of colic.

I would enjoy very much seeing comments on, or criticisms of this article.

C. A. MATTHEW.

Cumberland, Md.

PARALYSIS DUE TO UMBILICAL INFECTION

This case of infection occurred in a female, grade draft colt, four weeks old. A swelling had appeared in left hock and the colt was somewhat lame. The swelling later appeared in the right hock also.

Symptoms.—Upon examining this colt on June 22nd I found a swelling in both hocks and a small swelling on the left side of the thorax over the fourth rib in middle of the lower third. The colt was very strong, had a good appetite, a temperature of 103° F. and a pulse that, although accellerated, was good, but seemed to be unable to control the movements of its hind quarters. The following day the colt was about the same, except that it was unable to rise when down, but when helped could get up and stand unsteadily. On June 25th the symptoms of the ailment were all somewhat more marked; the colt could not stand alone, but the appetite was still good. It had some trouble in voiding urine, so I catheterized it and found some sediment in urine of purulent nature.

On June 29th the patient was very weak, head and legs were badly abraded by its struggling around in the stall. It was unable to get on its feet. I advised the owner to destroy it as I thought there was no chance for recovery.

Autopsy.—The colt was destroyed and the autopsy held June 29th. The abdominal cavity, on being opened, revealed the urachus and umbilical veins very much distended. Upon incising the urachus it was found to be filled with thick cheesy pus up to the bladder. The umbilical vein was also distended up to the liver, the two containing about one quart of pus. All other organs were normal. In the thoracic cavity there was an adhesion of the pleura and lungs to the region of the swelling on the outside. The fourth rib had been fractured at this point. I also found an abscess in the roof of the pleural cavity just below the fourth and fifth dorsal vertebrae. Upon opening the abscess and following up the cavity I found that it entered the neural canal and involved the spinal cord.

This case was one of great interest to me as it is the only one I ever saw showing paralysis. This paralysis was undoubtedly due to the involvement of the spinal cord.

H. M. HAMILTON.

Paris, Kentucky.

SELF INJURY A HABIT WITH THIS HORSE

I am sending you a case report of a horse that seemed to have a grudge against himself.

I was called to see this animal, a bay percheron gelding, two years old, July 20th, but was out of town and did not get there until about four hours after the horse was injured. He had jumped into a cement water tank and onto a water pipe, which had punctured the right side of sheath and penetrated the abdominal cavity. A loop of intestine about two feet in length protruded through the opening. The horse was unable to stand more than a minute at a time. The bowel was covered with dirt, commonly found in a barnyard and was badly swollen also. I washed off the dirt, by the use of plenty of warm water, enlarged the opening and replaced intestine, closed the upper opening with sutures, packed the wound with cotton, and allowed the horse to rise.

At this time his pulse was imperceptible, but he could stand and walk. I administered fluid extract of nux vomica and bacterins and left stimulants to be given every three hours. The next morning the horse was out in the pasture, eating grass, not much the worse for his experience. The wound was irrigated twice daily with

hot water and Azucamphine. On the 22nd I gave him another dose of bacterins.

He got along well until the 25th, when he fell and ruptured a blood vessel in the right flank. I saw him on the 26th, made an incision through the skin and removed about six quarts of clotted blood. The same antiseptic was used for this wound as for the first.

I did not hear from him again until August 7th, when the owner came in for more medicine. He reported that my patient's injuries were healing and that he was feeling fine, but said he had had an attack of colic on August 3rd and had also got one foot fast in a wire fence and had torn the hoof nearly off. However, this horse finally managed to fully recover.

J. O. R. CAMPBELL, M. D. C.
Geneva, Indiana.

ANESTHESIA ADVISABLE FOR MOST OPERATIONS

Anesthetics, if more widely used in veterinary surgery, would add materially to the standing of the veterinary profession. There certainly isn't anything more unscientific or more harmful to the good name of the profession than for several men, to restrain a small animal by force, and without an anesthetic of any kind, general or local, perform some painful operation which requires a considerable time, as, for instance, spaying a bitch or dissecting a scirrhous cord from a pig.

Anesthetizing an animal, whether large or small, is not a difficult undertaking if one uses the right kind of an anesthetic and if the operator is not in too much haste to get started with his operation and lets some inexperienced assistant that is doing the anesthetizing "dope" it to the patient.

Many practitioners never think of anesthetizing a hog when dissecting out a scirrhous cord or similar operation. They seem to fear to anesthetize an animal, and because of lack of experience won't consider an operation under anesthesia. After a few trials at anesthetizing an animal of this kind they will be surprised how safely and easily it may be done; and how neatly they can do the work; a thing that favorably impresses spectators and assistants.

Speaking of what anesthetics to use in certain animals, the pure sulphuric ether seems to be the safest on all small animals. When anesthetizing a large dog or bitch it is advisable to give hypodermically one to one and a half grains of morphine, thirty minutes before the operation. This makes the patient easier to handle when giving the general anesthetic. Hogs seem to be easier to anesthetize than dogs as they go under the influence of ether very rapidly, a thing which requires a little watching at first; if the patient seems to have quit breathing don't give up but get busy fanning and produce artificial respiration. Animals that seemingly quit breathing for a minute, or even longer, under ether anesthesia, can usually be brought back to life, as it were, in this manner.

The operator adds not a little to his own convenience by operating under anesthesia in this way, for he won't get besprinkled all over with blood from the struggling patient, and his patient is not going to die from shock. As to equipment for anesthetizing a small animal, all that is needed is a sponge, a tin can, and a towel. The can should be from six to seven inches long and four to four and a half inches in diameter. The sponge being large enough to fill about one-third of the can. Have a hole one inch square in the wall of the can, two inches from the bottom, through which to pour the ether on the sponge. The towel is to put over the patient's head, can and all, so no air is admitted if ether is used.

If one's assistants are not strong enough to hold patient while the anesthetic is given then it is well to tie the feet together, releasing them afterwards.

Some veterinarians when reading this article may say, "Of course I can anesthetize a dog or hog, what's the use in discussing that," but if a canvass were made the country over we should find that many practitioners won't or don't because they never had a good opportunity to learn it. Every student should receive a good training in the use of anesthetics, and then if he doesn't use them in practice should be handled by the law and punished for malpractice.

A very thorough description of general anesthesia is given in Quitman's Materia Medica.

F. C. MECKSTROTH.

St. Marys, O.

USE OF BACTERINS

Since I came to Indiana a few months ago I adopted the bacterin treatment for all suppurative conditions.

Last spring, I treated thirty horses for one of my clients for the prevention of strangles. Most of these horses received but one ampule of Abbott's Streptobacterins, and but one horse developed strangles. This horse made a speedy recovery after the administration of another ampule. Strangles was present in this stable when I began treatment, but this case had been treated by the old line method by another veterinarian. It was several weeks in recovering.

In every instance two ampules of streptobacterins prevented the spread of the disease in stables where the disease was present.

With three of four exceptions, two ampules cured every case of well developed strangles. The submaxillary swellings I blistered or opened when I was first called to see the case.

In one instance I was called three days after the appearance of strangles in a stable. The animal was discharging profusely from both nostrils, and was badly swollen in the submaxillary space. I gave this animal one ampule of strepto-bacterins at three day intervals until three doses were given, and opened one abscess. This horse made a rapid recovery and was put to work ten days after it received its first dose. Previous to having the strangles, this animal had a fetid discharge, which would not yield to medicinal treatment, from one nostril. After its recovery from the strangles, this discharge disappeared and the animal took on flesh rapidly.

Out of eight other horses in that same stable only a small undeveloped colt developed the strangles. This colt yielded to the bacterin treatment.

I have treated over one hundred horses for the cure and prevention of strangles with strepto-bacterins, and every client is very much pleased as I seldom give them any other line of treatment. And another thing that pleases the farmers is that with this line of treatment the horses do not have to be idle so long.

This spring and summer I have had several cases of septic arthritis. Every one yielded to the treatment with poly-bacterins. I had some cases where the joints were swollen enormously. After a few weeks' treatment with poly-bacterins (two ampules every three to five days, almost every dose was given at five day intervals; sometimes I gave three ampules at one dose) these swellings and the lameness disappeared.

In other suppurative conditions as in the foot or the joints, I use no other treatment than poly-bacterins.

I have found in talking with my fellow veterinarians that they do not use large enough dosage of bacterins. I often use three ampules at one dose.

On June 12th, 1913, I was called to a farm to see a mare which was unable to be moved from the orchard to the barn. The animal was swollen in all limbs and about the face and nose. At first examination it looked like a severe case of lymphatic trouble, but I finally diagnosed it as purpura hemorrhagica which it proved to be on my next visit. The mare was discharging very freely from both nostrils so I gave her an ampule of strepto-bacterins and put her on spirits of nitrous ether and potassium nitrate. The next day she was able to walk a little better. I continued to give the niter but I added 5-grain doses of bichromate of potash every four hours.

On June 15th, I gave her two ampules of strepto-bacterins and continued the use of the nitre and the bichromate of potash, but I had the owner give one pint of strong coffee to which was added one ounce of turpentine three times a day. I also left three doses of the tincture of iron chloride.

On June 18th, the discharge from the nose had disappeared, almost all of the swelling, except in the left hind leg, had disappeared. I continued the same line of treatment but gave her two ampules of poly-bacterins this time.

On June 21st, very little swelling remained. On June 26th, the owner came to my office and asked for a tonic as the mare was practically well.

Only on the second day was there a slight oozing of serum through the skin, and that was on the left hind leg.

I ascribed the early recovery from purpura hemorrhagica to the use of bacterins. All of the cases I had seen while in the east lasted much longer and were far more troublesome to treat, although the treatment was the same, excepting the use of bacterins.

This mare was eighteen years old and had her thirteenth colt at her side. The owner milked the mare each day during her sickness and made the colt suck another mare. When I saw the mare the latter part of July, the colt was sucking the mare again. The mare was in excellent condition.

This article I give to you as my actual experience with bacterins. Many readers may have had better results and many may criticise me. I stand ready for criticism.

EDWARD C. W. SCHUBEL, D. V. S.
Middlebury, Indiana.

A PECULIAR SHIVERER*

In October, 1910, a client purchased a three-year-old colt at Michaelmas sale, and on its arrival home worked it on the farm without shoes until Christmas time. Then, when the land got harder, he sent it to the blacksmith to be shod, and was much surprised to have it returned, as the farrier found he could not lift his front feet up. I was called in to see the colt and found that he could trot quite freely, could back without his tail quivering and seemed to all intents quite sound, until one tried to lift his fore feet up. Then he would begin to tremble all over and bear his whole weight on the limb you had hold of, so making it an impossibility to get it off the ground. I tried him with a rope over his shoulder to no effect, and even put him into slings so that we might shoe him, but all to no avail. Finally we had to cast him to shoe, and this was done periodically every few months until he was sold a short time ago.

One of the peculiar features about this case is that the farrier always shod his hind feet without any trouble right to the end. Finally, I might add, that three or four months after I first saw him he gradually developed into a typical shiverer, i. e., lifting his tail and hind legs when made to back, so there is no question in my mind that the symptoms I have described were due to "shivering."

WILFRED WALTERS, M. R. C. V. S.
Blofield, Eng.

*Reprinted from *The Veterinary News*

A CASE OF VOLVULUS

I was called early July 24th to see a black mare, aged, weight 1000 pounds, with colt, six weeks old, by her side. The owner said that he had found the mare sick upon arising that morning. She exhibited very severe colicy pains; would squat with abdomen close to the ground when led; or being loose in lot she would fall or lie down very suddenly and immediately roll upon her back, a position she was prone to keep for some time. She would get up and run possibly a hundred feet and then fall again. The pulse was fifty-four per minute; temperature normal; mucous membranes somewhat congested; peristaltic action in entire obeyance. There was but little flatulence.

I gave this mare one grain of arecoline and one-half grain of strychnine hypodermically with negative effect; repeated arecoline giving one-half grain, in one-half hour, still no peristalsis was evident. I then gave her two drams of cannabis indica intravenously and left for home. She law down on her side and slept four or five hours, when I was called again.

On my second visit I found the mare very uneasy as before; pulse sixty per minute, but strong; temperature 100.5° F.; membranes congested. I repeated the arecoline and strychnine as in the morning; with a rectal injection of cold water. This induced the passage of a little flatus, and slight peristaltic action on right side. Rectal examination at this time was negative. I tried to administer a drench

but the animal would not swallow and received some of it down trachea, which ran out when the head was lowered.

I left the animal about five p. m. lying upon her breast and very quiet. I told the owner she would die and that I thought she had some displacement of the bowel. I called next morning and learned that the mare had dropped dead about seven a. m.

Autopsy.—On opening the abdominal cavity there was revealed a quantity of dark bloody fluid; considerable peritonitis and the last loop of the small intestine, just before it enters the cecum, was tied in one complete knot, thus entirely obstructing the lumen of the bowel in a section three feet long.

H. M. HAMILTON.

Paris, Kentucky.

MORE VETERINARIANS FOR STATE WORK IN IOWA

Animal disease in Iowa is to get the attention now that the state's enormous $500,000,000 investment in live stock demands. Iowa State College of Agriculture and the Mechanic Arts has added to its corps of veterinarians an experienced veterinary specialist from abroad, Dr. Kurt Schern, recently with the Imperial Board of Health of Germany. His whole time will be devoted to the investigation of animal diseases and to a study of ways and means of checking epizootics and reducing losses. His first attention will be given to hog cholera, which cost Iowa farmers $10,000,000 or more last year and which has again cost them about as much more this year. He will first make a thorough survey of the cholera situation and then suggest methods of control.

Dr. Schern comes from Germany with wide experience, both in the laboratories of the Imperial Board of Health and in the field.

For his work a complete laboratory has been set up in the new veterinary buildings of Iowa State College. The State Board of Education has also provided a liberal fund amounting to $10,000 to carry on the work.

President R. A. Pearson expects to put the college actively at work all along the line to check the enormous livestock losses in the state from preventable diseases. To this end, the extension department has also been furnished with ample funds to carry on educational work among Iowa farmers. Director W. J. Kennedy of the agricultural extension force has on his staff three skilled veterinarians, Dr. K. W. Stouder, who came from Kansas to take his position, Dr. C. B. Rice, who came from extensive experience with the Kentucky Agricultural Experiment Station, and Dr. S. Q. Simonson who came from a successful experience in Georgia.

HERRING'S DISEASE IN MISSISSIPPI

On page 412 of the August issue of VETERINARY MEDICINE an error occurs in Doctor Herring's article in giving the ingredients of my prescription for the treatment of that peculiar, malignant type of shipping fever which has been common in this locality in recent years. The prescription should read as follows:

R

Cocainae	gr. 80
Codienae	gr. 40
Aquae Amygdalae Amar.	O ss.

Fiat mistura. Sig. Give one-half to one ounce every three hours.

Also in the ninth line in the second column of the same page the word "altered" is used for "alternated."

I never fail in the treatment of this peculiar throat trouble where I get the case before the tongue protrudes from the mouth or gangrene has set in. The past month I successfully treated two cases, one in a driving mare that was as bad as any I have ever seen.

If possible avoid using the trachea tube. As a rule it is ineffectual and does harm. None of our veterinary works explain this disease at all, as it occurs in this locality. In addition to the symptoms given by Doctor Herring there is a great deal of cutaneous emphysema about the sides of the head and submaxilliary space, due to air escaping through a laryngeal opening. In this stage blisters do harm. It is much better to use a good stimulating liniment.

The best that I know of for this condition is ichthyol (Merck), or equal parts of ichthyol and olive oil. Ichthyol penetrates the unbroken skin, is readily oxidized, and in this way abstracts oxygen from the tissues.

I first saw this Herring's disease a long while ago. The first case I remember was in a two-year-old, gray Clyde in the spring of 1895 near Pana, Illinois. It was more prevalent last winter than at any previous time.

THOS. TRINDER.

Vicksburg, Miss.

BRASS HOSE COUPLING ON DOG'S PENIS

I was called to see this canine on October 8th, 1913. The owner stated that the animal had been ailing about two weeks, could not retract the penis. On examination I found the penis very much swollen, anteriorally; very much depressed posteriorally, due to pressure of the coupling which was small in diameter, one-half to three-quarter inch. The coupling was pushed as far back as it would possibly go.

As I saw the operation for the removal of the coupling would last for some time I concluded to perform it without anesthetics. The mouth was firmly tied, and using warm water and alum the tissues were relaxed; this aided very materially. Now the assistant held the sheath back, and I started to file on anterior part of coupling, when nearly through I cut through with cutters, to avoid injuring the soft tissues. When the coupling was cut one-third of length on top I held one side firmly, while my assistant took hold of the other side with pinchers and twisted it off all the way round, then I drew the coupling forward, which was a difficult task as it had a large raised collar on posterior end, then having it forward I proceeded on the second, third, and so on, until all was removed. The animal stood the ordeal well as it took three hours all told. The owner's son had put the coupling on the penis.

Probably a case of this kind will never be heard of again so I thought it would be a good one for veterinary history and for the readers of the journal.

E. B. BUNTING, V. M. D.

Hightstown, N. J.

TORSION OF THE UTERUS IN A MARE*

On May 9, 1913, at 6 p. m., I received an urgent message to attend a mare which was unable to foal. On my arrival I learned that the mare showed labor pains when on the plough at 9 o'clock that morning, and so was brought home. Much to owner's surprise, although her labor pains kept coming on every few minutes, they never seemed sharp enough to cause her to strain. I found the mare's temperature and pulse to be about normal, and on introducing my hand within the vagina everything seemed natural, although there was no appearance of foaling, the os uteri being quite closed. The mare kept walking round and round the box, then dropping to the ground in pain, only to jump up again and almost directly without showing any tendency to strain. I was inclined at first to regard it as a case of colic, but the bowels seemed quite active, and the mare dunged and staled regularly about every half hour. I prescribed a laxative drench, but refrained from sedatives, as I did not wish to retard the labor pains.

These symptoms went on unceasingly from 8 a. m. on May 9 to 6 p. m. on May 11, and although at times the mare suffered fearful agony and was white with foam, she never showed any tendency to strain.

At 6 p. m. on May 11, I received another urgent message, and found that she was now straining violently and passing a few drops of liquor amnii. On passing my right hand within the vagina I found the os uteri to be partly opened, but to my surprise I was unable to effect an entrance to the uterus.

I now inserted my left hand, and found that directly I passed through the os, if I turned my hand sharply to the right, I was able to enter the womb and find the foal tucked into the right flank of mare. Of course, I now saw that I had a case of

*Reprinted From *The Veterinary News*

torsion of the womb to deal with, so inserting my left arm again, I tried to work the womb back into its correct position by moving my arm towards the left flank. After a time I was able to straighten the womb a little, and with my left hand managed to rope the fore legs and head of foal, and when these were pulled steadily towards the left side of the mare, we were able to deliver the foal and right the uterus at the same time.

The mare was naturally very weak and almost in a state of collapse, so we gave her half a pint of neat whisky, rugged her up, and rubbed her all over with embrocation. Next day she had a temperature of 104° F., but showed no symptoms of metritis. On the following day her temperature dropped almost to normal, and she passed out of my hands on the 14th.

Remarks.—I consider I was very fortunate in being able to foal this mare so easily—it took only about half an hour—as I quite expected I should have had to resort to chloroform, and perhaps roll her down hill. I should like to draw attention to the fact that, in spite of her being in labor fifty-eight hours, she had no inflammation of the womb or uterine passages. This was undoubtedly due to the fact that she did not strain at all throughout her long period of labor.

WILFRED WALTERS, M. R. C. V. S.
Blofield, Eng.

SCHOOL FOR HEALTH OFFICERS, CONDUCTED BY HARVARD UNIVERSITY AND THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Beginning this fall Harvard University and the Massachusetts Institute of Technology are to maintain in cooperation a School for Public Health Officers. The facilities of both institutions are to be available to students in the School and the certificate of public health (C. P. H.) is to be signed by both President Lowell and President Maclaurin.

The object of this School is to prepare young men for public health work, especially, to fit them to occupy administrative and executive positions such as health officers or members of boards of health, as well as secretaries, agents, and inspectors of health organizations.

It is recognized that the requirements for public health service are broad and complicated, and that the country needs leaders in every community, fitted to guide and instruct the people on all questions relating to the public health. To this end, the instruction of the new School will be on the broadest lines. It will be given by lectures, laboratory work, and other forms of instruction offered by both institutions, and also by special instructors from national, state, and local health agencies.

The requirements for admission are such that graduates of colleges, or technical and scientific schools, who have received adequate instruction in physics, chemistry, biology, and French or German, may be admitted to the School. The medical degree is not in any way a pre-requisite for admission, although the Administrative Board strongly urges men who intend to specialize in public health work to take the degree of M. D. before they become members of the School for health officers.

The Administrative Board which will conduct the new School is composed of Professor William T. Sedgwick, of the Massachusetts Institute of Technology; Professor Milton J. Rosenau, of Harvard; and Professor George C. Whipple, of Harvard. Professor Rosenau of Harvard has the title of Director, and the work of the School will be under his immediate supervision.

INTUSSUSCEPTION A MISNOMER IN SCHROER'S CASE

In the September issue of VETERINARY MEDICINE, I notice an article headed "Possible Intestinal Twist or Intussusception," by Frank H. Schroer, who asks for advice.

If I may be allowed to express my humble opinion (with which others may not agree), I would say that the diagnosis—flatulent colic—is wrong. The patient was bloated, breathing hard and regurgitating gas. My idea of flatulent colic is—gas in the colon. This trouble was in the stomach, evidenced

by the sound of gas coming up through the mouth and by the only slight relief after tapping, the latter being the invariable result when the stomach is distended as in acute indigestion, which, I am satisfied, this case was. The overdistended stomach crowded all the organs of the thoracic cavity, resulting in difficult breathing and rapid pulse.

For some years, acute indigestion cases gave me great trouble and kept me casting about for remedies. I have tried all that has been offered. Owning both double and single stomach tubes, I have, possibly because of its stiffness, better results with a piece of good garden hose. Even that I do not use often. I have found a better way.

Now, let me speak of arecoline, the much used drug which works quickly and satisfactorily, when the cases are properly selected. If not, however, much harm is done, as in the case before us, as I see it. Arecoline should not be used in acute indigestion; or, at least, not until the gases either have been removed by the stomach tube or have passed on to the intestines.

The habitual use of a favorite drug sometimes leads to misuse, as is illustrated by the popularity some years ago of barium chloride for colics. In my enthusiasm, I wrote an article for *The Review* stating that I would be lost if out on a call without it. (Barium is still among my drugs, and would be used oftener if it were not that the injection must be made intervenously instead of hypodermically, requiring more time and a sharper needle.) But I learned that barium is not infallible, and, if my case were not properly selected, I had difficulty covering up the reason for some of my patients' passing over to the majority.

But, to my dosage in acute indigestion: first, inject one-half to one grain of eserine sulphate (Merck's); then fill two-ounce capsules as full as possible with salicylic acid—quicker results can be obtained by slitting the sides of the capsules with a knife before passing them down; give from one-half to one grain of strichnine sulphate and await results, which will not be very long in coming.

Many veterinarians use eserine, if at all, cautiously, due, I believe, to over-dosage. For convenience and accuracy of administration, I dissolve a 10-grain sealed tube of eserine in chloroform water, proportioned so that my syringe, when filled with the solution, will contain one grain. On the start I give only one-half grain, giving the other half about an hour later, if the case justifies it. I occasionally pass the tube and wash out some of the contents from the stomach, but it is not often necessary with this treatment. I do very little drenching or giving medicine with a syringe—the stomach has enough trouble without having to contend with a lot of drugs at such a time.

All that line of treatment in the article referred to—sodium bicarbonate, spirits of ammonia, turpentine and nux vomica in repeated doses—is both unnecessary and harmful. I am reminded of an occasion several years ago when, after reviewing a recovery and my heroic treatment, my hearer inquired if it were "because of, or in spite of."

J. C. CALLANDER.

Parkersburg, W. Va.

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[Doctor Schroer's treatment might be further criticized as to the extraordinary amount of medicaments used, which, had not absorption from the alimentary been in entire abeyance, would have killed the patient, promptly; e. g., eight ounces of nux-vomica was given in a period of five hours and the dose of arecoline was scarcely less excessive. Regarding the above, the duration of the attack and its intermittency would seem to indicate an obstruction of the large intestine rather acute gastritis. What say others?—ED.]

MEMORIAL

To the Members of the American Veterinary Medical Association in Convention Assembled—

Gentlemen:

As the result of much study and observation in connection with the slaughter of large numbers of Hogs at packing houses under United States Government Inspec-

tion we deem the following observations of timely importance to the members of your Association and of even greater interest to the Farmers and Stockmen whom you serve.

We recognize the Niles-Dorset Serum for the treatmentof hog cholera as the most valuable agent now employed for this purpose. We recognize that in the hands of competent veterinarians this serum may be safely administered and prove of great value. We also believe that in the hands of the average farmer and unskilled operator, the use of this serum may cause serious damage to portions of hog carcasses. We believe that improper serum, the use of dirty syringes accompanied by general unsanitary conditions after treatment will result in serious damage.

As the proper area for inoculation is still an open question, we wish to suggest that some place other than the ham be properly designated as suitable for the purpose. There is a probability of ham inoculation causing abscesses not discoverable until the ham is sliced for use.

So serious has the situation become, that one packing firm has undertaken a series of comparative experiments, in which groups of live hogs are being vaccinated in the neck, shoulder, flank and ham. These groups will be kept separate, slaughtered separately and injury to the carcasses carefully compared by United States Government Inspectors.

We wish to bring this matter strongly before the attention of the American Veterinary Medical Association, with a recommendation that the matter be investigated and, if possible, some action taken to check this preventable damage.

In our opinion serum should be used only by competent practicing veterinarians. The use of serum by farmers and incompetent laymen should be discouraged as far as possible.

J. J. FERGUSON,
Secretary and Treasurer.

Resolution was presented to Dr. C. J. Marshall, Secretary, American Veterinary Medical Association, September 4, and referred to Committee on Resolutions, Dr. W. H. Dalrymple, Louisiana, Chairman.

Resolution was endorsed by Committee and referred to American Veterinary Medical Association, whereupon the following resolution was passed:

RESOLVED—That the recommendation contained in the attached Memorial from the United States Live Stock Sanitary Association, through its Secretary, Prof. J. J. Ferguson, be endorsed by this Association. CARRIED.

Book Reviews

(*Continued from page 656*)

Practical Bacteriology, Blood Work and Animal Paristology, including Bacteriological Keys, Zoological Tables and Explanatory Clinical Notes, by E. R. Stitt, A. B., Ph. G., M. D., medical inspector United States Navy; graduate London School of Tropical Medicine; head of department of tropical medicine, United States Naval Medical School; professor of tropical medicine, Georgetown University; lecturer in tropical medicine, Jefferson Medical College; formerly associate professor of medical zoology, University of the Philippines and instructor in bacteriology and pathology, United States Medical School.

This work is essentially a laboratory manual and is a very satisfactory one. It gives in detail the cultural characteristics, staining reaction and microscopic experiences of all pathogenic organisms, with a detailed description of general laboratory technic, preparation of media, pathologic diseases, etc., etc. Bound in flexible cloth. 408 pages. Well illustrated. Published by P. Blakiston's Son and Company, Philadelphia. Price $1.50 net.

WORMS HEADS THE ILLINOIS EXAMINING BOARD

At the last meeting of the Illinois State Board of Veterinary Examiners, Dr. C. Worms, 2932 Broadway, Chicago, was elected chairman of the Board, vice Dr. John Scott, Peoria. This meeting was held in Springfield, Illinois, October 8th and 9th. There were elevenapplicants for license and of the eleven that took the examination only three passed, and were issued licenses to practice veterinary medicine and surgery in this state.

Has melted lard purgative qualities equal to oil?

NEW COMMITTEES OF THE A. V. M. A.

The following are the officers of the A. V. M. A. for 1913–14 and the committees appointed by President Marshall to serve for the coming year.

President, C. J. Marshall, Philadelphia, Pa.

First vice president, Frederick Torrance, Ottawa, Ont.

Second vice president, Adolph Eichhorn, Washington, D. C.

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NEWSPAPER COMMENT

DR. HERMAN GROSS, formerly of Webster, has removed to Sisseton, South Dakota.

—

FOUR applicants appeared before the Veterinary Examining Board of South Dakota on October 17th, and all passed with excellent grades. Their names were: R. Arbeiter of Marion; F. C. Colgan of Scotland, and A. F. and F. V. Reichman of Armour.

—

THE Attorney General of South Dakota has ruled that no one can secure a "vested right" to practice medicine in that state, and that veterinarians in practice before the enactment of the veterinary practice law must meet the same conditions imposed upon those beginning practice after the passage of the act. That is that they must pass an examination before they can be licensed to practice.

—

DR. R. C. BALL of Titonka, Iowa, has purchased a residence and will soon locate for practice at Monitor.

—

DR. W. A. FRY of Fort Smith, Arkansas, assistant state veterinarian and widely known throughout the state, died of blood poisoning October 14th from infection received through a scratch on the hand while operating on a horse.

—

DR. O. Q. MOSEY, formerly of Iowa City, Iowa, has moved to Mount Vernon and opened an office at the Petty Livery Barn.

—

DR. D. F. LUCKEY, state veterinarian of Missouri, says that Missouri is seriously handicapped by the awkwardness of the law in regard to the control of hog cholera. He asks that the manufacture and distribution of hog cholera serum be taken away from the Agricultural College and placed in the State Veterinary Department.

—

DR. EDWARD MACKEY of Bismarck, North Dakota, was seriously injured in an auto accident recently.

—

SEVERAL score of dairy cattle in districts west of Milwaukee have recently died from what is supposed to be acorn poisoning.

—

THE courts have held that the recently enacted antinarcotic law in New York makes it illegal for a retail druggist to fill a prescription from a veterinarian or dentist which calls for cocaine. This was unintentional on the part of the law makers.

—

THE thirty-first annual meeting of the Illinois Veterinary Medical Association will be held at the Lexington Hotel, December 4, 5 and 6. This is during the week of the International Live Stock Show at the Stock Yards in Chicago, and is immediately following the annual meeting of the United States Live Stock Sanitary Association, which will meet in this city December 2, 3 and 4.

FOR the first time in the history of the Illinois Veterinary Medical Association veterinarians are invited to bring their wives to the annual banquet. L. A. Merillat, 1827 Wabash Avenue, is secretary.

—

THE Department of Public Health of Spartanburg, South Carolina, issues a monthly bulletin that will be found of much interest to veterinarians engaged in municipal meat and milk inspection. For the bulletin address Dr. B. F. Kaupp, Commissioner of Public Health, Spartanburg, South Carolina.

—

WE RECEIVE many inquiries from veterinarians wishing to change their locations and who because of their health or for other reasons desire to remove to the mountain states. Much information regarding the climate of Wyoming may be obtained from Bulletin No. 100, recently issued by the Agricultural Experiment Station at Laramie. The title of the bulletin is "Meteorology for Twenty Years." A large number of tables are given showing the variations in temperature, in moisture and in wind velocity in various sections of the state.

—

STUDIES on the Virus of Hog Cholera, by Walter E. King and Robert H. Wilson, of the Research Laboratories of Parke, Davis & Co., has been reprinted (in English) from the *Zeitschrift Fur Immunitatsforschung und Experimentelle Therapie*, and may now be obtained from the authors.

—

CORRECTING WATER, by H. C. Hamilton, of the Research Laboratories of Parke, Davis & Co., has been reprinted from the *Bulletin of Pharmacy*, August, 1913, and may be obtained from the author.

—

PREVENTIVE Measures Against Equine Influenza Based on Its Bacteriology, by N. S. Ferry, of the Research Laboratories of Parke, Davis & Co., has been reprinted from the *Report* of the Proceedings

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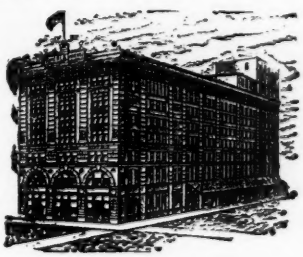

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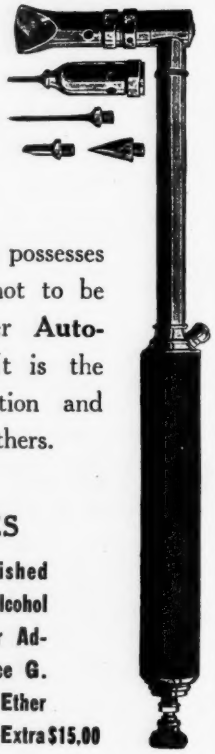

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of the United States Live Stock Sanitary Association, December, 1912, and may be obtained from the author.

—

THE marriage of Dr. James S. Watson and Miss Daphne Camp has been announced. Their home will be in Mexia, Texas.

—

THE Agricultural Experiment Station at Berkeley, California, has just issued a circular (No. 106), by James F. Mitchell, giving directions for the use of antihog-cholera serum, A number of illustrations are given showing the various regions in which the serum may be injected and giving the advantages and disadvantages of each.

—

THE cost of milk production is the subject of Bulletin No. 145 of the Massachusetts Agricultural Experiment Station at Amherst. The statistics and other data are obtained from observations of the state herd in which it was shown that the actual cost of producing a quart of milk, testing five per-cent butter fat, is five and forty-five one-hundredth cents. As the customary wholesale price of milk at the farm is less than fifteen cents per gallon this bulletin would indicate that the production of milk is not a profitable business for the dairyman.

—

DR. L. H. COULSON of Grayslake, Illinois, was married September 10th to Miss Lillian Turner of the same town. The ceremony was performed at Crown Point, Indiana. Doctor Coulson has built up a good practice in Grayslake.

—

DR. CHAS. J. GRIFFIN has recently purchased

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—

On Account of ill health Dr. E. D. Harris, professor of anatomy in the North Dakota Agricultural College, has severed his connection with the college and will locate at Waycross, Georgia. Doctor Harris says North Dakota has a glorious climate in the summer time, but in the winter——.

—

Dr. A. D. Galbraith and wife, of Greensburg, Indiana, will spend the winter at Orlando, Florida.

DEATH OF DOCTOR ELMER CRAFTS

Dr. Elmer Crafts, President of the Utah Veterinary Medical Association, died at his home in American Forks, Utah, Friday, October 17th, 1913, from congestion of the lungs, due to exposure at Salt Lake City, October 4th, while attending the annual meeting of the Utah Veterinary Medical Association, of which he was elected president. Doctor Crafts was born at Cedar Fort, Utah, September 24, 1877. He was a graduate of the Utah Agricultural College and of the Veterinary Department of the Ohio State University. He leaves a widow and two small children.

His illness was of such short duration and his death so sudden, that the news was hardly credible to his many friends.

The Association, by his death, lost a good leader and the profession an ardent supporter. This Association joins with his many friends in extending heartfelt sympathy to the bereaved family.

E. P. Coburn,
Brigham City, Utah. *Sec'y.-Treas.*

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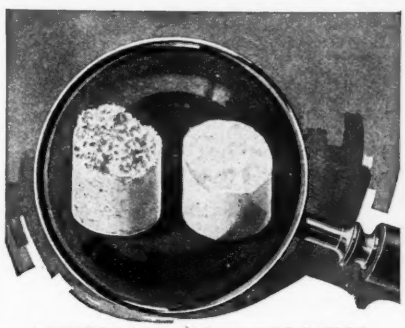
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The annual meeting of the Illinois State Veterinary Medical Association will be held at the Lexington Hotel, December 4th, 5th and 6th, 1913. Prepare now to come to this meeting, which promises to be a most interesting one. A program replete with good things will be mailed you about November 22nd. Bring the ladies with you this year, as they for the first time in the history of our Association will be invited to attend the Annual Banquet. Make your reservation with the hotel in due time; the management will be pleased to serve you. For any further information, please address

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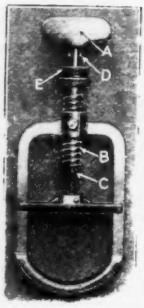

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.

Of AMERICAN JOURNAL OF VETERINARY MEDICINE published monthly at Chicago, Illinois, required by the Act of Congress, August 24, 1912.

Editor, D. M. Campbell, 1761 Lawrence Avenue, Chicago, Ill.; managing editor, none; business manager, none; publisher, D. M. Campbell.

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Known bondholders, mortgagees, and other security holders, holding 1 percent or more of total amount of bonds, mortgages, or other securities: none.

(Signed) D. M. CAMPBELL.

Sworn to and subscribed before me this 13th day of Sept., 1913.

M. A. SHERMAN.

(My commission expires March 18, 1916.)

[SEAL]

NEBRASKA'S VETERINARY LAW NOT A DEAD LETTER

The state law against the alleged veterinarians or horse doctors advertising themselves as such when they do not possess a diploma is being enforced in this county. This forenoon Charley Dillon was arraigend in Judge Pfleiderer's court pleaded guilty and received a fine of $25 and costs.

Jas. Jordan, of Hardy, Neb., who has been advertising himself as a veterinary surgeon, was brought before Judge Peebler in the County Court yesterday on the charge of violating the State Veterinary Practice Act.

This provides that no person shall assume or use the title of veterinary surgeon or analagous title unless he is the lawful holder of a State Certificate of Registration showing that he has passed a prescribed examination in veterinary medicine and surgery given by the State Board of Veterinary Examiners.

These proceedings were caused to be instituted against this man over a month ago by Dr. Carl J. Norden, of Nebraska City, who represents the State Veterinary Prosecuting Committee, and whose duty it is to see that violators of this law are prosecuted.

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Mr. Jordan was first brought into Justice Tipton's court at Superior for trial about two weeks ago, where a demur against the charges preferred was made by the attorney for the defense and sustained by the judge.

The attorney for the defendant contended that according to his interpretation of Webster's definition the words "Veterinary Surgeon" or "Veterinary" were not the title or analagous title referred to in the law.

These charges in the same form were then presented before Judge Peebler resulting in a warrant being sworn out for the arrest of Jordan, and that he appear in County Court for trial the next day. Continuance being asked for until the 2d inst., was granted.

In County Court yesterday the same attempt was made to show the illegality of the charges but unsuccessfully. Webster's dictionary and Cobbey's statutes were quoted by County Attorney Brubaker which resulted in proving to the court that Jordan had violated the law by assuming a title to which he had no right. He pleaded guilty, his fine and costs amounting to $81.00.—*Superior* (Nebr.) *Express*.

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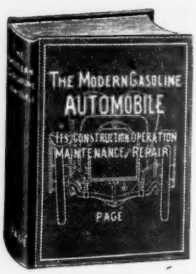

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TWELFTH ANNUAL MEETING NORTH CAROLINA VETERINARY MEDICAL ASSOCIATION

The North Carolina Veterinary Medical Association met in its twelfth regular session in the rooms of the Industrial Club, Salisbury, N. C., June 24, 1913, at four o'clock p. m. and was called to order by the president, Dr. L. F. Koonce. In a very happy manner Hon. W. H. Woodson extended to the visiting veterinarians a hearty welcome, which at once made them feel at home in the city. This address was responded to by Dr. Koonce, president of the Association.

The following members were present at this meeting:

Drs. Ashcraft, Bullock, Carroll, Chrisman, Herring, Hornaday, A. C. Jones, Koonce, Parker, Petty, Renihardt, Roberts, Ragland, Spencer Spoon, and Wolfe.

The minutes of the regular meeting held in Raleigh June 25 and 26, 1912, as well as the called meeting of February 20, 1913, were read by the Secretary and approved.

The Legislative Committee reported the passage of a law at the last legislative session providing a penalty for violations of the Veterinary Practice Act.

A committee consisting of Drs. Chrisman, Wood, Roberts, and Ashcraft reported and the Association unanimously adopted the following resolutions:

WHEREAS, it hath pleased our Heavenly Father, in His wisdom to take from our midst our beloved brother, Dr. F. S. Charter:

BE IT RESOLVED, that we extend to his bereaved family our deepest sympathy, and that a copy of

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this resolution be spread upon the minutes of our Association.

On motion the business session was deferred until a later hour, and an address was then delivered by Dr. A. T. Kinsley, Kansas City, Mo., on the subject, Veterinary Education in the Future.

This address was given very close attention and at its conclusion, by unanimous vote, the Association thanked Dr. Kinsley for his presence and made him an honorary member of the Association.

This was followed by a banquet at the Empire Hotel, at which short talks were made by those present and the evening quickly passed in a round of enjoyment and good fellowship.

June 25, 1913. The following made application for membership in the Association adn were duly elected: Dr. W. H. Kern, Winston Salem, N. C.; Dr. G. C. Cress, Mt. Ulla, N. C.; Dr.H. B. Flowe, Raleigh, N. C.; Dr. R. B. Jones, Wadesboro, N. C.; and Dr. J. I. Weeks, Clinton, N. C.

The following papers were read and discussed: History of Veterinary Practice in North Carolina, by Dr. J. W. Petty; A Peculiar Case of Human Rabies, by Dr. R. H. Parker; Methods of Control of Infectious Diseases of Live Stock in North Carolina, by Dr. W. G. Chrisman; Unusual Shipping Diseases of Horses, by Dr. L. J. Herring; Miscellaneous Paper, by Dr. T. N. Spencer; Diseases of Chickens, by Dr. L. F. Koonce; Miscellaneous Paper, by Dr. W. A. Hornaday; Parasites of Domestic Animals in North Carolina, by Dr. G. A. Roberts; Report of Cases, by Dr. Watt Ashcraft.

The following officers were elected by acclamation for the following year:

President, Dr. M. J. Ragland, Salisbury, N. C.

First vice president, Dr. R. H. Parker, Gastonia, N. C.

Second vice president, Dr. R: W. Wolfe, Hickory, N. C.

Secretary, Dr. J. P. Spoon, Burlington, N. C.

Treasurer, Dr. B. B. Flowe, Raleigh, N. C.

Dr. Watt Ashcraft was unanimously recommended to Gov. Craig for appointment on the State Board of Examiners for the term beginning July 1, 1913.

An executive committee consisting of the officers of the Association and the Board of Veterinary Medical Examiners was and is to be annually appointed. The duties of this committee shall be to make investigations as to the fitness for

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membership of any applicant desiring to join this Association.

On motion, the convention adjourned to meet in Wilson, N. C., in June, 1914.

J. P. SPOON, D. V. S.,
Secretary.

Burlington, N. C.

THE new hospital and clinic buildings of the New York Veterinary College at Ithaca were formally opened November 15th with appropriate exercises, to which all veterinarians in the State and many others were invited.

DR. FRED C. CATER, formerly of the B. A. I. Rinderpest-Serum Laboratory in Manilla, has associated himself with Dr. J. H. Oesterhaus of the "Big O" Serum Co., in the manufacture of antihog-cholera serum.

AN ANNOUNCEMENT has been received of the marriage of Dr. James F. Hughes and Miss Mary Lee, Tuesday, Nov. 11th, at Green Isle, Minn. They will be at home at Glencoe, Minn., after December 1st. Doctor Hughes has built up an excellent practice in Glencoe.

ATTENTION, KANSAS VETERINARIANS

THE tenth annual meeting of the Kansas Veterinary Medical Association will be held at Manhattan on Tuesday, Wednesday and Thursday, January 6, 7, and 8, 1914. J. H. Burt, secretary and treasurer, Manhattan, Kansas.

DOCTOR BURNS KILLED BY AUTO

Dr. Claude C. Burns, Bement, Illinois, was instantly killed November 2nd, and his mother and a nephew badly injured, when a car which Doctor Burns was driving at night in a blinding rainstorm ran into a ditch and overturned.

Doctor Burns was twenty-nine years old, a graduate of the Chicago Veterinary College in the class of 1909 and a member of the Illinois Veterinary Medical Association. After graduation Doctor Burns returned to his home town and had already established an excellent practice in Bement.

SALMON'S WORK IN URUGUAY PRAISED

In the *Consular Trade Reports* for October 16 an entire page is given to the description of the Uruguay Veterinary College, which the government engaged Dr. D. E. Salmon, formerly Chief of the United States Bureau of Animal Industry, to organize.

Following a description of the buildings, the grounds, and the equipment, all of which are elaborate, and of the course of instruction, for which a bachelor's degree will be required for matriculation beginning with 1914, the report is summarized thus: "Doctor Salmon completed his work in a most satisfactory and able manner, remaining one year longer than his contract called for, the result being one of the largest, best equipped, and most modern institutions of its class in existence."

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